

The Quaternion

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Feature Article: Outreach Program helps Schoolchildren Catch Up

Several members of the Mathematics Department run a program to help disadvantaged schoolchildren catch up in their education, and help parents develop their tutoring skills. The *Urban Scholars Outreach Program* (USOP) runs classes on Saturday mornings on campus for students in nearby schools who need

Outreach

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failure). In addition, the program relies on parental support, to keep the schoolchildren on line between Saturdays.

Being only two years old, the success of the USOP is hard to evaluate, although most students in the program have shown marked improvement in their regular schoolwork (and many get onto their school honor rolls). (The original program, run by Professor Rao, has a considerable success record, but it also has a different audience.) The USOP appears to be more successful with younger schoolkids (no surprise): older children tend to be more pessimistic about their prospects, and to have more bad habits. The children tend to have materialistic goals (when I grow up, I want a house and a car and ...), so motivating them requires clear demonstrations that their goals can only be achieved by regular hard work. The courses are on reading and writing and, the big hurdle, mathematics: all elementary and secondary topics from arithmetic to calculus are taught.

The program has about 15 to 20 volunteers on average. While some faculty participate, along with some members of the outside community, the program relies heavily on advanced undergraduate and graduate students from the Colleges of Arts & Science, Education, and Engineering. In addition, Professor Tsokos is running a 1-credit course on pedagogy, which has participation in the program as part of the course assignment. Professor Tsokos observes that in the current academic job market, demonstrated teaching ability is required for the majority of available academic positions – and a record of educational service to the community impresses prospective academic employers. College student volunteers get a certificate of appreciation, and letters of reference. Students interested in getting additional teaching experience are welcome: again, as Professor Tsokos hopes to expand the program to meet the demand, more volunteers are needed.

Joy

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is not the science of mathematics, but the language of mathematics. The process is so tedious, boring and time consuming that after a while we learn to think of it as the science of mathematics and thus find it to be unbearable.

As a young boy I was completely turned off by music. My music teachers forced me to spend hours playing scales. I hated it. Of course I could still appreciate music, but I never wanted to play it.

Joy

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It was known for a long time that π is a “transcendental number” (whatever that means). The proof of this is really difficult, and not many other transcendental numbers were known. So what happens if the question is not whether a given number is transcendental or not, but whether there exists a transcendental number? Cantor had a beautiful proof that transcendental numbers exist. He created an argument that said that the set of all numbers is larger (much larger) than the set of non-transcendental numbers. Thus there are transcendental numbers. Get it? If the number of fruits in your refrigerator is larger than the number of apples, then you can conclude that there is a fruit in there that is not an apple. This is an *existence theorem*. Well, actually Cantor’s argument showed a lot more. It said that virtually all numbers are transcendental. So π is the rule while the numbers like 1 and 2 and 3 are the exceptions. And yet these are the numbers that everybody knows.

Mathematics is full of interesting unanswered questions of that nature. Most of my work had circled around the questions that ask whether infinite-dimensional objects with certain properties exist or not. Instead of trying to find or construct the object I try to prove that it exist by the means similar to those described above. Almost inevitably it leads to a conclusion that virtually every object has the required property, but I don’t know a single one of the kind.

Well this was my attempt to translate some mathematics into English. Had anything been lost in the translation? Practically everything. I could not describe the objects in question. I also deprived you from enjoying the sheer beauty and elegance of the

Walter Williams

Walter E. Williams, a longstanding member of the Department, died on February 14, 2000, of cancer.

Walter Williams received an A.A. from Ashland Junior College in Kentucky, and then went to Miami University of Ohio, where he received a B.A. and an M.A. in mathematics. As Frank Cleaver (another departed member of the faculty) told it, Williams was selling insurance in Tampa when USF opened in 1960, and he heard that USF needed teachers. He applied for a job, and was hired as an Instructor in 1961; he was promoted to Assistant Professor in 1964.

Williams helped form the mathematics departments (plural!) in those early years, including preparing the first mathematics brochure and, later, the brochure for the College of Natural Science. In 1971, he became "Assistant to the Chair" under Chairman Jogi Ratti, and later that same year he became "Assistant to the Dean" under Dean Ashford of the College of Natural Science; he served as Assistant Dean until he returned to the Department in 1982. And while assisting Dean Ashford and later Dean Ray, he earned a doctorate in Education from Nova University.

Williams co-authored three books. The first was *Pre-Calculus Algebra and Trigonometry*, co-authored with Frank Cleaver, and published in 1971 by Holt, Reinhart, and Winston. The second was *Fundamentals of Business Mathematics*, co-authored with fellow faculty member Jim Reed, and published in 1975 by Holt, Reinhart, and Winston. The third was *Mathematics for Business and Economics*, co-authored with Jim Reed, and published in 1978 by Holt, Reinhart, and Winston.

MAA at USF

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was a Student Oriented Special Session for college students interested in mathematics and mathematics education, and a Special Articulation Session to address one or more of the following issues: "Who is teaching mathematics at the various levels and are they qualified?" and "How can adjuncts be used most effectively?" and "How are Computer Algebra Systems impacting on the way that we teach mathematics?" The primary speakers were **Colin Adams**, Mark Hopkins Professor of Mathematics at Williams College in Williamstown, Massachusetts, who spoke about "Real Estate in Hyperbolic Space: Investment Opportunities for the Next Millennium" (in the character of Mel Slubgate, a sleazy real estate agent), and **Fred Richman**, Professor of Mathematics at Florida Atlantic University in Boca Raton, who spoke about "What is Constructive Mathematics?" (in constructive mathematics, one proves that objects — numbers, diagrams, etc. — exist by constructing them).

Nagle Lecture Series

The Spring, 2000 Nagle Lecture was delivered by **Jerrold Marsden**, Professor of Control and Dynamical Systems at CalTech and Professor Emeritus at UC Berkeley. He spoke about "Dynamical Systems and Space Mission Design," specifically about the problem of sending a low-thrust (hence, low-cost) mission to the moons of Jupiter. This talk concentrated on one of the great problems of astrodynamics: the three-body problem. How do three celestial objects, like the Sun, Earth, and Moon, move under gravity? And how can we construct an itinerary for a spacecraft navigating through these celestial objects?

We will be having another Nagle Lecture this Fall: **A. K. Dewdney** will be speaking on *Do Aliens Do Math?* on October 12. See the Events Calendar above for details.

Faculty News

We have three new faculty this year. **Mohammed Elhamdadi** received his Ph.D. from the University of Nice - Sophia Antipolis in 1996, and works in alge-

braic K-theory and algebraic topology. **Anton Kaul**

Student

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In Fall, 1999: Rachelle Margaret Brunton, Jamie Lynn Gerber, Rosanna Maria Saraceno, and Trina Nicole Talley.

In Spring, 2000: William Alex Dorosin (cum laude), Tho Hu Huynh, Cynthia Lee Lozano, Thuc Doan Nguyen, and Dan Ruelos Paraoan.

Student Clubs

ME and the Student Chapter of the MAA again worked together to provide mathematics students a varied and interesting program.

The year began with Kathleen Meirau's address as President of USF ME in which she discussed "Pascal's Triangle." Katie joined Michael Lopez, Kevin Wagner and Melissa Holmes as the Math Clubs' Team in the USF Quiz Bowl. The Team won Silver as they came in second with Michael the highest scoring individual in the entire tournament and Katie and Kevin placing in the top ten. After two meetings at which we talked about plans and munched pizza, we addressed student concerns about life after USF. We asked Patricia Pekovsky, Director of Graduate Admissions, to discuss the steps involved with applying