MAXIMA: News and Highlights from the Department of Mathematical Sciences

The University of Texas at El Paso http://www.math.utep.edu Fall 2006

From the Chair

I hope you will enjoy our annual newsletter. We have had an exciting year teaching our students, doing research, and reaching out to the community. With the hard work of everyone in our department, the number of math majors at UTEP has gone up substantially during the last five years. While the number of undergraduates has increased from 82 to 147, the number of graduate students now stands at 70, as compared to 20 students in 2001.

We are welcoming two new faculty members as Assistant Professors to our department this fall: Dr. Kien Lim (Mathematics Education) joins us after completing his doctoral studies at San Diego State University. Dr. Andrzej Pownuk, who works in Applied Mathematics, holds a Ph.D. in Civil Engineering and comes to UTEP from the Silesian Technical University in Gliwice (Poland).

We continue to make progress with our first doctoral program - I am therefore confident that the first students will be able to enroll in the interdisciplinary Ph.D. program in Computational Science two years from now.

(continued on page 2)

HOMECOMING!!

Our traditional Homecoming Coffee for alumni, faculty, students and department friends is Saturday, November 4, from 10–noon in Bell Hall 125. The event is free and no reservation is required. For more information, contact Mrs. Lanna Tallmon (915-747-5761, lanna@utep.edu) or visit our website at www.math.utep.edu

UTEP Celebrates Pi Day 2006!

Club Zero members braved a day of high winds at the Union Breezeway to host Pi Day 2006—the 300th anniversary of the use of that Greek letter for this special number— a successful followup to last year's UTEP debut Pi Day.

photo by Lorena González; L to R: unknown, Enrique Treviño, Eric Reyes

As advertised in the UTEP *Prospector*, celebrations began with a morning "Pi-rade" of club members and friends walking around the Union with the first few of the infinitely many digits of pi. The club also organized a fund-raiser by selling tasty individual pies, Pi Day removable tattoos, and the new Club Zero T-shirts (the back designed by Carlos De la Mora's brother Diego, the front by Laura Solorzano and Oswaldo Sanchez).

The "Puzzle Table" was particularly successful in getting passersby to stop and stay, trying their hand at challenges such as "Connect Four", modified tic-tac-toe, the number strategy game "fifteen", pyramid dissection puzzles, and pi-related activities such as finding out how many head-circumferences tall you are (people tend to overestimate this) or conducting the Buffon Needle experiment.

In the afternoon, seven contestants dirtied their faces in the rush to win the Pie Eating Contest – delicious whipped cream-covered chocolate pies made by Lorena González. Eric Reyes was the winner, receiving a t-shirt and tattoo. Another contest was to see who could write down from memory the most digits of pi. There was a tie for first-place (at 200 digits!) between undergraduate Jaime Ramos and teacher Mr. Jorge Viramontes, who each received a special t-shirt. Undergraduate Abraham Macias won third place with 100 digits. The celebration concluded with an enthusiastic sing-along of pi song parodies led by Dr. Larry Lesser such as his "American Pi" from MAA *Math Horizons*. Pi fun was not limited to college students, however, as Drs. Lesser and Kosheleva helped Canutillo Elementary have its debut Pi Day event this year, attracting coverage on KDBC-TV and Univision.

Other Club Zero highlights of the year included having eight club members attend the MAA Joint Mathematics Meetings, including a poster presentation by undergraduate Enrique Trevino. Club Zero is also involved in an international project called Ciencia de Frontera, at the UACJ (Universidad Autónoma de Ciudad Juárez) under the coordination of UTEP's Jorge Lopez. Each Saturday, members present a 30-minute activity for high school and university students on topics such as Desargues' Theorem and a Pythagorean Theorem generalization.

Dr. Art Duval's Teaching Recognized

At the 2006 Honors Convocation, Dr. Art Duval received the University of Texas System Chancellor's Council Outstanding Teaching Award for UTEP, capping a recent string of teaching awards that also includes distinguished teaching awards from UTEP's College of Science and from the Southwestern Section of the Mathematical Association of America. Duval joins departmental colleagues Nancy Marcus (1998) and Bill Kaigh (1994) as having won a university-wide teaching award.

In the words of one of his students, "When Dr. Duval teaches a math class, he is so enthused about the subject that it's impossible not to have your own curiosity sparked." In Dr. Duval's words, "I want students to discover that math can be challenging and fun. As a teacher, my job is not to be a gatekeeper, but a facilitator." Since arriving at UTEP in 1991, Duval's commitment has gone beyond classroom walls, including encouraging students to call him at home to discuss mathematics, serving as faculty advisor for Club Zero, and working with mathematics educators on many P-16 educational initiatives in the El Paso region.

Duval with UTEP President Dr. Diana Natalicio
photo by Ben Torres Jr. in the *UTEP Prospector*

From the Chair (continued from page 1)

The department is particularly grateful to Mrs. Katsuko Huntley for establishing an undergraduate scholarship fund in memory of her late husband, our long-time colleague Mr. Lawrence Huntley. With this endowment we will be able to support outstanding mathematics students in need of financial support.

Let me use this opportunity to express our gratitude also for your generous contributions to the Gladman and Gregory Scholarship Funds during the last year. Your continued support will be greatly appreciated by our students.

We are especially asking for your contributions to our Excellence Fund this year. This fund helps us pay for student travel to conferences and other items not covered by our budget.

– Helmut Knaust

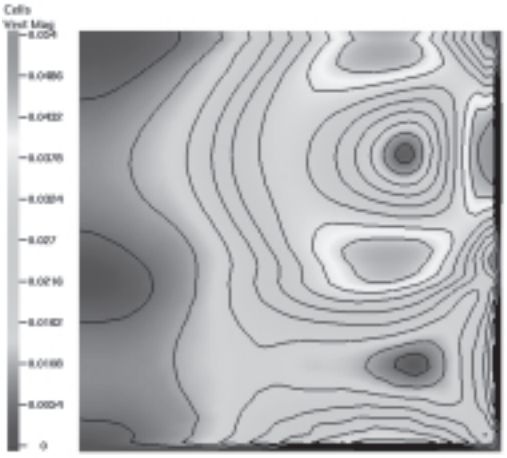
UTEP to Host Conference on Finite Element Methods

Dr. Pavel Šolín is chairing the NSF-supported debut conference Finite Element Methods in Engineering and Science December 11 – 15 at UTEP. FEMTEC 2006 aims to advance the frontiers in performance and reliability of finite element methods, as well as in their application to large-scale problems in computational engineering and science.

The research of Šolín and other College of Science faculty (see hpfem.math.utep.edu) benefits from a 72-processor Cray XD1 supercomputer Dr. Šolín acquired from a $200K Department of Defense award in 2005. Šolín's *FEM* textbook was published last year by Wiley.

The finite-element method (FEM) originated in the early 1940's for solving complex elasticity, structural analysis problems in civil and aeronautical engineering. FEM is characterized by mesh discretization of a continuous domain into a set of discrete sub-domains (e.g., a lattice or finite triangular subregions). The method has since been generalized into a branch of applied mathematics for numerical modeling of physical systems in a wide variety of engineering disciplines, e.g., electromagnetics and fluid dynamics. Mathematically, FEM is used for finding approximate solution of partial differential equations (PDE's) as well as of integral equations such as the heat transport equation.

The FEM is a good choice for solving PDE's over complex domains (like cars and oil pipelines) or when the desired precision varies over the entire domain. For instance, in simulating the weather pattern on Earth, it is more important to have accurate predictions over land than over the wide-open sea.



computer simulation of electromagnetic stirring of a molten metal (axisymmetric model)

Alumni Notes

Don W. Gaudin's (B.S. Math 1978) wife Carmen relayed the sad news that Don died September 16, 1992 in a plane crash in California. He had received his Masters in Economics in 1981 from Stanford University and worked for PNM in Albuquerque, retiring in 1990.

Martha P. (Castillo) Herrera (B.S. Math-Secondary Cert. 1996) teaches math at MacArthur Middle School, in her 10th year with EPISD. She also worked with the El Paso Collaborative for Academic Excellence as a Lead Learner 2002-04 and with Drs. Lesser and Tchoshanov in a 2005-07 TEA professional development grant.

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Layout and production by
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Department of Mathematical Sciences

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Supplemental Instruction Enhances Calculus Success

Dr. Emil Schwab's $300,000 grant from the Department of Education aims to help the success of STEM (science, technology, engineering, mathematics) students in calculus by adding supplemental instruction (SI) to the existing successful modular calculus format directed by Dr. Nancy Marcus. One characteristic of Schwab's vision of SI is that it does not target high-risk students (as tutoring might), but rather all students in high-risk courses such as calculus.

Before, calculus students simply had 4 hours of lecture each week. Under this new format, however, a calculus student gets 3 weekly hours of faculty lecture in a classroom of 45 students and 2 hours of SI in a smaller group of 15 students. In the smaller group setting, students engage in active learning, problem solving, and team projects. The SI meetings are facilitated by student leaders who were trained in specific learning theory and teaching techniques, attend each of the lecture meetings, and meet regularly with the instructor. In spring 2006, math majors Heidi Arellano and Walt Bales successfully served as the pioneering SI leaders for Dr. Osvaldo Mendez' pilot section, and attended a conference on Peer Leader Training at the University of Houston. An anonymous survey of spring 2006 SI students found a huge majority agreed (with no one disagreeing) that the SI sessions were interactive and the overall course with SI was superior to a standard course. Also, the drop rate in the SI section was less than 1/3 of the rate in the standard sections.

Starting with the fall 2006 semester, the great majority of calculus sections will be delivered in this new format and the 10 current SI leaders received specific training over the summer for their roles. For more information, please visit: www.math.utep.edu/classes/calculus/schwab/.

De la Mora Wins Thesis Award

One of the department's best success stories, Carlos de la Mora received the Outstanding Undergraduate Thesis Award for the entire "hard sciences" trio of colleges (Science, Engineering, Health Sciences) at the 2006 Honors Convocation. De la Mora, who earned a minor in physics to go with his bachelors in mathematics, began mathematics PhD studies at the University of Iowa this fall.

His advisor, Dr. Piotr Wojciechowski, relates, "I met him in 2002 at the 'Abel' group of mathematically-inclined high school students in Cd. Juarez. After the lecture, a very young-looking and a bit too enthusiastic boy approached me and asked several questions related to the topics [matrices and order relations]. I immediately recognized a big scientific potential in this young man."

Shortly after this recruiting event, De la Mora enrolled as a UTEP undergraduate, earned several scholarships, and by Spring 2005 had begun a research collaboration with Wojciechowski that led to a joint paper ("Multiplicative bases in matrix algebras") to appear in the prestigious journal *Linear Algebra and its Applications*.

ADDRESS SERVICE REQUESTED

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