The Quaternion

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The Newsletter of the Department of Mathematics and Statistics

The Quaternion is an annual publication of the USF Department of Mathematics and Statistics, which can be visited on the web at <http://www.math.usf.edu/>. Our our snail-

students twice a week for 75-minute auditorium lectures and TAs met the students twice a week for 50-minute help sessions.

Dr. Fran Hopf is an instructor at USF. She started teaching here in 2001.

The results of Dr. Hopf's Spring 2011 pilot were immediately encouraging. The failure rate on the common final exam was 13% less for t58 1.44 822 TD [C7T 1 silun-10(T(ons)-1(.)-2(on s)-1(1(h)- -2(l)-2(e)-2(e)4(s)-1(s))Tj ET3ude)4(nt)-2(s9

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Calculus (MAC 2233) has made some moves in this direction. Clearly we have come a long way from the days when a piece of chalk was the essential teaching tool - the times they are a-changin'!

Faculty News

This year, two USF instructors were promoted to assistant professor, and we welcomed a new assistant professor to the department.

Arthur Danielyan joined the Department in 2003 as an instructor. A native of Armenia, he was an undergraduate and a graduate student at Yerevan State University in Yerevan (the largest university in Armenia), but he received his Ph.D. from the Institute of Mathematics of the Academy of Sciences of Armenia in 1987 – when Armenia was still a republic of the USSR. He simultaneously served as a lecturer at Yerevan State University and as a researcher at the Institute of Mathematics for the Academy until 1994, when he joined the Moscow Aviation Institute as a senior scientific researcher (while simultaneously visiting Moscow State University and later the University of Oldenburg, in Germany). In 1998 he came to the United States, visiting the University of South Florida and then the University of Central Florida, until 2003. He works in complex analysis and approximation

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Nataša Jonoska and **Masahico Saito** edited an anthology on *Discrete and Topological Models in Molecular Biology*, published by Springer. Articles in this book include expository chapters on discrete mathematical modeling of biological phenomena – from algebra, combinatorics, and topology – from leading scientists of the field. And with Laura Landweber in Princeton, they were awarded a National Institutes of Health grant for $ 1,999,995, the first NIH grant awarded to the department.

The *Second International Workshop on Nonlinear and Modern Mathematical Physics* met on USF Tampa in March had 49 invited speakers and attracted 71 participants from twelve nations. The local organizing committee included **Sherwin Kouchekian**, **Wenxiu Ma**, and **Razvan Teodorescu** as well as Roy Choudhury, David J. Kaup, and Constance SchobBT hou3 Tc 0.12 -0 0cond5bhtv(c)4(hob)1(hy)4(s)t6( )1(og)-10T hou3 Tc, and

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STEM Education Center

The STEM Education Center went national this year. The Center conducted the 34th summer program for gifted high school students. The four-week program was from July 8 through August 2. For the first time in its history, the program was residential. Students came from Florida and states that included Connecticut, Georgia, Maine, Massachusetts, New York, and Pennsylvania. Twenty-one students participated both in classwork and research.

The daily program started at 9:00 am and went through 4:00 pm. The courses covered included the following:

1. ***Genetics***: Principles, processes, and research methodologies in Mendelian and molecular genetics. Taught by Dr. Johnny El-Rady and Valerie Carson.

2. ***Bioinformatics***: A project-based course that develops skills in analyzing and interpreting biological data. Taught by Dr. Jing Wang.

3. ***3D-Visualization***: Creating visualizations to reveal patterns and correlations to gain insight into various research projects. Taught by Dr. Lori Collins, Howard Kaplan, and Travis Doering.

4. ***Linear Algebra***: Methodology and applications of linear algebra. Taught by Dr. Thomas Bieske.

5. ***Interdisciplinary Science***: Cross-cutting concepts in various fields of science. Taught by Dr. Donald Haynie.

In addition to the courses offered, students visited the Morsani College of Medicine, the Nanotechnology Research and Education Center, and the Kennedy Space Center. A trip to Clearwater Beach, the campus recreation facilities and a chess tournament were also provided.

During the commencement ceremonies students gave a brief description of the research projects they were involved in.

The program received support from the College of Arts and Sciences, the Department of Mathematics and Statistics, University College, Academy of Applied Science/Army Research Office, the Jacarlene Foundation, The Jagged Peak, and Brooks/Cole Publishing.

Manoug Manougian is the Director of the STEM Education Center, and Richard Warner is the Assistant Director.

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Student News

We were proud during commencements in August 2012, December 2012, and May 2013 to send eighty students on their way.

54 students received baccalaureate degrees: Jenna Aman; Saurabh Arora, *with honors*; Caleb Beachy; Kyle Beard; Kitoxtansoma Bradley; Jason Burgess; Harold Chick; Brittany Cobb, *with honors*; Lennon Conson; Sarah Croome, *Cum laude*; Daniel Cruz, *Magna cum laude with honors*; William Deering; Jeremy Dreyer; Aaron Driscoll, *Cum laude with honors*; Zachary Forrest, *Summa cum laude*; Robert Glorioso; Robert Gougelet; Sandali Handagama, *Cum laude with honors*; James Harnage; Kimberly Hess; Derek Hoge, *Cum laude*; Daniel Inness; Cody Johnson; Ryan Kempey; Peter Kirby; John Kurkowski; Daviel Leyva; Ariele Lindemeyer, *Magna cum laude*; Jennifer Lovell, *with honors*; Paul Mayers; Gabriel Mayor; Ketner Merise; Christine Morgan; Katelin Newcomb; Jessica Norris; Travis Orcutt; Eduardo Ortiz; Eduardo Perez; Victoria Perkins; James Pham; Wyatt Radabaugh; Andrew Reilly; Jamie Sprecher, *Summa cum laude with honors*; Phyllis Taylor; Steven Valente, *with honors*; Jason Valle; Magdalena Viera-Bugari; Gurnos Watson; Brendan Weger, *Cum laude*; Donald Willard; Nathaniel Wolford; Tavier Wright; Timothy Yeatman; and Aaron Zemetres.

Thirteen students were awarded Masters' degrees: Hongyi Chen, Gaojie Gong, Yin He, Courtney Howard-Kirby, Seang-Hwane Joo, Arbin Rai, Pulahinge Hansapani Rodrigo, Eric Thompson, Ryan Thurman, Ching-Chi Yang, Tadesse Zerihun, Mengshu Zhang, and Dan Zhao.

And thirteen received Doctoral degrees: Alrazi Abdeljabbar, *Wronskian, Grammian and Pfaffian Solutions to Nonlinear Partial Differential Equations*, under Wen-Xiu Ma; Teffera Asfaw, *Topological Degree and Variational Inequality Theories for Pseudomonotone Perturbations of Maximal Monotone Operators*, under Athanassios Kartsatos; Jill Dizona, *On Algorithmic Fractional Packings of Hypergraphs*, under Brendan Nagle; Egor Dolzhenko, *Modeling State Transitions with Automata*, under Nataša Jonoska; Waththage Fernando, *A Study of Permutation Polynomials Over Finite Fields*, under Xiang-Dong Hou; Zahra Kottabi, *Statistical Modeling and Analysis of Breast and Pancreatic Cancers*, under Christos Tsokos; Jinghan Meng, *Bi-integrable and Tri-integrable Couplings and Their Hamiltonian Structures*, under Wen-Xiu Ma; Tilahun Muche, *Hamiltonian Set of Polygonal Paths in 4-valent Spatial Graphs*, under Nataša Jonoska; Arnut Paothong, *Dynamic Processes in Network Goods: Modeling, Analysis and Applications*ko(G)-2(an)-14(al)-8.

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New PME inductees.

PME Outstanding Scholar Award recipients Jamie Sprecher (left) and Sarah Croome (right)

Newly inducted PME members who received membership certificates at the induction ceremony were: Wael Al-Sawai, Nana Osei Bonsu, Sandali Handagama, Toni Jung, Ram C. Kafle, Doo Young Kim, David Kotschessa, Denys Kukushkin, Shanna Lindemeyer, Elizabeth Loyer, Venkateswara Rao Mudunuru, Joel Negron, Janmarie Pena, Muditha Devamita Perera, Hoang-Chi Phan Do, Keshav Pokhrel, Darian Rivera, Jared Sango, Taysseer Sharaf, Brandon Sweeting, Juliana Teodorescu, Bhikhari Thari, and Nicholas Valdes.

The PME Outstanding Scholar Award, awarded every year to graduating USF math students that exemplify academic excellence and dedication to mathematics, this year went to math majors Sarah Croome, and Jamie Sprecher. They each won $250.00 Nagle Memorial Scholarship awards, and commemorative plaques.

The president and vice-president of the Florida Epsilon Chapter of PME during the academic year 2012-2013 were math majors Timothy Yeatman and Sarah Croome. The faculty advisor is Dr. Fernando Burgos, and the chapter's permanent correspondent is Dr. Milé Krajčevski.

PME members and math majors Ryan Arredondo and Tim Yeatman attended the PME national meeting in August of 2013 that took place during the MAA MathFest in Madison, Wisconsin. Ryan's presentation was *Nesting Index for Assembly Words* and Tim's was *A Pictorial Introduction to Knot Theory*.

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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. 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., CMC342, Tampa, FL 33620.

Appeal for funds

We are a growing department, 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.

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