The Quaternion

The Newsletter of the Department of Mathematics, USF–Tampa

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1 Chairman's Comments

by Marcus McWaters

The new SUS classification system, approved by the Regents at their November 19th meeting at USF, established FSU, UF and USF as the top-tier Research I universities in the state. This classification will make USF eligible for state funding that is designated for enhancement of research and graduate programs. It is reasonable to expect that our department, already a top research unit at USF, will benefit from this additional funding.

In general, I expect that the initial "research" money made available to the Research I universities will go to departments that either have a new program or a healthy program with clear growth potential. Our immediate challenge is to invigorate our graduate program and to continue to bring in high-quality graduate students. This is a universal challenge to all relevant departmental committees. The Graduate Admissions Committee is attempting to increase the visibility and attractiveness of the department to potential graduate students via a poster suggesting that students pursue their graduate work in mathematics and work on their tan at the same time. It will be interesting to see how many of our new graduate students admit to having been influenced by this advertisement.

The Undergraduate Committee is working to restructure our program offerings to appeal to a wider range of interests and to encourage growth in the number of students that either major or minor in mathematics. Of course, we will encourage our better undergraduate students to enroll in our graduate programs. Our willingness to make our offerings relevant to the non-traditional student body we serve will very much determine whether and how much we prosper.

2 The Nagle Lecture Series

The R. Kent Nagle Lecture Series continued this Fall with a lecture on November 5 on the *Mathematics of Games and Sports* by Joseph Keller. Keller is Professor of Mathematics and Mechanical Engineering at Standford University. He is a member of the National Academy of Science, a foreign member of the Royal Society of London, and he is a recipient of the Wolf Prize and the National Medal of Science.

He started by talking about playing cards, and dealt with the recurring problem of how many times one must shuffle a deck, along with some other problems. He then discussed sports statistics, and looked at such issues as how should teams be ranked? How should weightlifters, of varying weights, be ranked? And he explored such issues as the ever-decreasing world-record time for sprinting, and how a runner should vary his speed in a race. He concluded with an argument, based on the number of heart beats in a lifetime, that a moderate exercise regimen is best for longetivity.

On January 21, Simon Levin gave the Nagle Lecture on *The Rise and Fall of Biodiversity.* Levin is the George M. Moffett Professor of Biology at Princeton University. He was President of the Society for Mathematical Biology, and of the Ecological Society of America. He was a Guggenheim Fellow, and is

a Fellow of the American Academy of Arts and Sciences and of the American Association for the Advancement of Science.

After a brief description of the history of mathematical ecology, he described some of the major issues today. He described how differential equations can describe how populations of two species will be distributed through space. This leads to the problem of how local actions generate large-scale or even global effects. He mentioned the Gaia hypotheses, which run from a relatively noncontroversial assertion that the biosphere interacts with the atmosphere to a controversial hypothesis that the biosphere manipulates the atmosphere: he said that he regards the stronger Gaia hypotheses with some wariness. Finally, he mentioned a number of human-generated problems, especially the dramatic increase in extinction rates and global warming.

We will continue the lecture series next Fall, so stay tuned.

3 Faculty News

Greg Budzban, who received a Ph.D. from USF in 1991 under Arun Mukherjea, is visiting us for a year during his sabbatical from the Southern Illinois University at Carbondale. Budzban is working with Mukherjea on the road coloring problem from an algebraic view point, in addition to trying to extend his dissertation results concerning convergence of probability measures on semigroups. They are organizing a special session at the AMS meeting at Gainesville in March, 1999, with P. Fainsilver.

Mourad Ismail was the main speaker at four conferences. In May, he gave a talk on "Discriminants and electrostatic models for orthogonal polynomials" at the International Mathematics Conference in Kuwait, and then a talk on "Discriminants and difference equations for discrete orthogonal polynomials" at the Symmetry and Integrability of Difference Equations II Conference in Sabudia, Italy. Then he gave a talk on "Orthogonal polynomials and their zeros at the Continued Fractions and Applications Conference in Columbia, Missouri. (He also gave a colloquium talk at the University of Trier in Germany.) Then in August, he gave a talk on orthogonal polynomials at the Second Meeting of the Palestine Mathematical Society in Israel.

Professor Ismail also talked about "Zeros of orthogonal polynomials" in the Special Session on Orthogonal Polynomial Series at the September meeting of the American Mathematical Society in Chicago. He also talked about the Rogers-Ramanujan identities at the Special Session on Partitions and q-series at the October meeting of the AMS in at Penn. State.

Natasha Jonoska, Masahico Saito, and Stephen Karl of Biology, presented a paper on "Three Dimensional DNA Structures in Computing" in the 4th DNA Based Computers Workshop last June.

Natasha Jonoska and Max Garzon of the University of Memphis presented a paper on "Bounded Complexity for DNA algorithms" at the 4th DNA Based Computers Workshop last June.

Gregory McColm spoke "On the Evolution of Random Structures" at the joint Society for Industrial Mathematics / Discrete Mathematics Conference in July at Toronto.

Ed Saff was an invited main speaker at the international conference Approximation Theory VI, held January, '98 in Nashville. His lecture was entitled "Fast Decreasing Rational Functions". Ed Saff was an invited participant at the Oberwolfach, Germany, Math Institute conference on Computational Aspects of Orthogonal Polynomials, in March, '98.

Ed Saff was appointed President of the newly formed nonprofit foundation Center on Distance Education for Lifelong Learning (CDELL). The mission of CDELL is to serve as a clearinghouse and umbrella organization that provides resources and research to educational institutions, labor and management organizations, professional associations, and individuals so that all these entities may more effectively pursue their common interest in fostering model distance education activities for lifelong learning. CDELL will be an affiliate of the Norway based ICDE (International Council for Open and Distance Education) which sponsors the biannual World Conference on Distance Education.

CDELL plans to conduct workshops on the following topics: lifelong learning for the American workforce, intellectual property issues in distance educa-

tion, sources for funding and grantwriting in in distance education, and the use of new technologies in course delivery. In addition, CDELL will encourage research on distance education via its unique mini-grants program and will recognize outstanding achievements in distance education via its annual presentation of the Candle Light Award.

4 CMS News

The Center for Mathematical Services continues to be involved in outreach and service activities to the service area of the University. A recent activity for the Center was coordination of a Mathematics Field Day on the Tampa campus.

On Nov. 13 about 150 high school mathematics students and 40 high school mathematics teachers came to USF to participate in a day of mathematical activities. The students came from Hillsborough, Manatee, Pasco, and Pinellas counties. Each school in these counties was permitted to send up to four students to the Field Day. Professor Mary Parrott gave a talk in the morning session on "The Role of Mathematics in Studying Emerging Diseases" and Professor Natasa Jonoska gave a talk during the afternoon session entitled "How far are we from liquid computers?" Ten faculty from the Department hosted small groups of students to talk about careers, university experiences, and other topics of interest to the students.

The students were given a tour on campus during their stay here by undergraduate University ambassadors while the teachers were treated to a luncheon in the Marshall Center. At the end of the day, students attending were given a certificate in recognition of the fact that they had been selected by their school to be participants in the Field Day.

The Center is planning summer programs again for high ability secondary students. In the planning stage are three programs - the Mathematics and Science Program, the Mathematics and Engineering Program, and the Biomedical and Life Science Program. Each of these are six-week programs that begin in the middle of June. About 180 students are expected to participate this coming summer in these programs.

Information about the activities of the Center can be obtained by calling 974-4068.

5 Student News

Last year, in Spring and summer, we had ten undergraduates get their BAs.
SPRING 1998
Tri Huu Huynh, Magna cum laude
Kristen Diane Johnson, Summa cum laude
Teresa Hague Silvernail
Paul Edward Thorne
Tina L. Mulligan Westervelt, Magna cum laude
Sean Wayne Woodruff
SUMMER 1998
Stephen Wayne Drier
Hungliang Lee
Cheryl Marie Neely
William David Wolcott
Four students got MAs:
SUMMER 1998
Marina Appiou
Somjit Datta
Jamie McGaughey
FALL 1998
Michael Santore
And one student got a PhD:
SPRING 1998
Lubomir Markov
Dr. Markov's thesis was: *An l_2-approach to second order functional evolutions in banach spaces.*

6 Student Clubs

Pi Mu Epsilon, the Mathematics Honor Society, and the USF Student Chapter of the MAA met jointly again this year under the leadership of their respective presidents, Louis Camara and Matthew Carman. As is tradition, the year began with Louis Camara's Inaugaral Addres. Louis discussed his own study of "The General Term of the Fibonacci Sequence". Our

second meeting featured one of the most popular topics for our members with Dan Van Hoose's discussion of "Career Opportunities for Math Skilled People". We were fortunate to have as our guest at the third meeting, Carlos Bertha, graduate student in the Department of Philosophy, to discuss "Mathematical Aspects of Logical Positivism".

On the last class day of the Fall Semester, the regional meeting, SUNCOAST XXIII, was held at the Brandon Campus of Hillsborough Community College.

The 23rd annual regional meeting of the Florida Section of the MAA was held at the Brandon Campus of Hillsborough Community College on December 4, 1998. Janet Sibol, a USF alumna and an instructor at the Brandon Campus, organized the meeting. Approximately twenty presentations were given, including several by USF faculty and students. Faculty presenters included Dr. Edwin Clark on "The Minimum Number of Points Required to Generate All Slopes in a Finite Plane", Dr. Athanassios Kartsatos on "Degree Theory to Solve f(x) = p", Dr. Gregory McColm on "Going by the Book: Requiring Students to Read the Book", and Dr. Fredric Zerla on "Aspects of Algebra in Ancient Times". Two members of the Math Clubs presented talks. Louis Camara repeated his talk on "The General Term of the Fibonacci Sequence" and Daniel Jelsovsky, now a doctoral student in the Department of Mathematics, gave "An Introduction to Knot Theory". Recent Ph.D. recipient Lubomir Markov returned to present "The Transformation of Inversion", while doctoral student David Benko spoke on "Harmonic Series and Related Topics. The meeting closed with a talk by Dr. David Rabson of the Department of Physics on "Periodicity, Aperiodicity and Suggestions from a Physics Professor on Mathematics Teaching Methods".

7 Survey

We are redesigning the newsletter to try to make it more interesting and useful. In this issue, we enclose a survey form on the newsletter. Please take a few moments to fill it out and mail it in.

8 Feedback

We always like feedback: we are trying to reach out to the community. Our website is at:

`http://www.math.usf.edu`

We can be reached by e-mail at:

`mathdeptmath.usf.edu`

Our phone number is (813) 974-2643; our fax number is (813) 974-2700; and our mailing address is:

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