Quaternion

Department of Mathematics Newsletter

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CHAIRMAN'S COMMENTS

Mathematics is underexposed in the public eye. One is more likely to read in the press of achievements in other disciplines such as science, medicine, and art than of achievements in mathematics. Consequently, even very educated people are unaware of the importance and revelance of modern mathematics. No wonder mathematics is sometimes referred to as our invisible culture.

Even though it is generally understood that mathematics is somehow the basis for science and technology, there is little understanding as to how vitally and extensive mathematics forms this basis. Too many perceive mathematics as old and static and have no idea that it is constantly being created in response to real problems in society.

The mathematics community is now making efforts to educate the public about the work of mathematicians and acquaint the layman with a bit about the nature of modern mathematics. An example of this effort is the recent National Mathematics Awareness Week. The recent International Congress of Mathematicians was well covered by the press and more than fifteen articles covering the conference have appeared in nationally circulated newspapers.

Not too long ago an article appeared in the Los Angeles Times entitled "New Codes May Be the Key to Atom Test Ban Treaty". It describes how public-key cryptography could be used to insure that a nuclear test ban treaty between the superpowers would be verifiable without using satellite surveillance or unreliable seismic monitoring. The mathematically based scheme would prevent cheating by each side.

Such an article is important because it conveys to the public an example of how relevant and important mathematics is - in this case to national security. Unfortunately, only those who delve more fully into public-key cryptography would come to understand that this application of mathematics is based upon beautiful, fundamental, pure, century-old mathematics, developed by mathematicians unaware of future applications, but that is now being more fully explored and created to respond to current applications. In other words mathematics is not old and static but growing, dynamic, and constantly being renewed in both applications and theory. This is the message that must be impressed upon the public. Hopefully there will then be an increasing recognition that support for basic research is a must and our national security depends on it.

CHINESE EXCHANGE PROGRAM

During June of this year, Professor Nagle had the privilege of representing the Department in the Department's exchange program with Zhejiang University in Hangzhou, China. The first two weeks he spent lecturing at Zhejiang University on "Boundary Value Problems For Nonlinear Elliptic Partial Differential Equations." He also had the opportunity to meet with Professor Dang and Professor Wu who also work on partial differential equations. His host, Professor Guo, arranged for Dr. and Mrs. Nagle to visit several of the local attractions.

After lecturing in Hangzhou, the Nagles travelled to Huangshan, Nanjing, and Beijing to do some sightseeing. Professor Nagle found China to be a fascinating country with a rich history dating back over 2500 years. He was most impressed by the friendly people.

CLEAVER HONORED

Professor Frank L. Cleaver was recognized for his many years of quiet, dedicated service to the mathematics community of the university and the state at the University Honors Convocation on October 17. In presenting the President's Distinguished Service Award, President John Lott Brown noted Dr. Cleaver's role in developing and shaping the under-graduate and graduate curriculum and programs in Mathematics at USF, his aid in achieving the University's affiliation with the national mathematics honorary fraternity, Pi Mu Epsilon, and for his many years of advising students. President Brown then noted Dr. Cleaver's work with the State Mathematics Articulation Committee which set the minimum standard for mathematics courses in higher education in the state and for his role in the founding and functioning of the Florida Section of the Mathematics Association of America, whose Secretary - Treasurer he was from 1969 until 1982. Frank Cleaver is the first professor to be honored by the University for Distinguished Service.

CENTER FOR MATHEMATICAL SERVICES

For six weeks in June and July of this year, the Center for Mathematical Services (CMS) hosted 156 gifted junior and senior high school students primarily from Hillsborough and Pinellas counties. These students came to the USF campuses in Tampa and St. Petersburg to learn college level mathematics, physics, engineering, and biology. Some of them worked in laboratories doing research with faculty in medicine, chemistry, and geology. All of them improved their skills with computers. In addition to the many microcomputers that the CMS provides, the students worked on the main frame IBM's as well as on the Vax, Primes, Cyber, and Harrises housed in the Colleges of Natural Science and Engineering. This summer, like last, the University offered college credits for successful completion of the high school programs if the students so elected. USF also awarded three Freshman Scholar Awards to outstanding seniors in these programs.

Training Programs in Applied Mathematics are currently offered by the CMS. In these programs USF students are hired by the Center to work on contracts with local businesses and industries. A student typically works at the company for 15 hours per week on a special project of importance to the company. This provides the student with first-hand experience in applied mathematics that is invaluable in obtaining a position in industry. Over half of the trainees receive job offers upon graduation. This past year the Center had trainees working at GTE Data Services and Honeywell Aerospace.

A new program is having a trial run this fall. It is designed to help foreign graduate students develop the English language skills they will need to become Teaching Assistants for the Department. One English speaking graduate student is working with six foreign students every week both in informal conversation and in a more formal lecture environment. It is hoped that this experience will help students pass the English language examination required by the State of Florida for all foreign students for whom English is a second language.

Anyone interested in obtaining additional information about the Center for Mathematical Services or about any of its programs may contact Dr. Kent Nagle, Director, Center for Mathematical Services, University of South Florida, Tampa, Florida 33620.

PI MU EPSILON

The Florida Epsilon Chapter of Pi Mu Epsilon Fraternity recognized the accomplishments of two mathematics majors with invitations to membership over the summer. Jahan Ghotb and James Loafman will become members at the annual Induction Banquet in April.

The chapter officers, President William Hughes, Vice President Margaret Martinek, and Student Correspondent Richard Moscatello, planned a full schedule of mathematical presentations for the Fall Semester. As is traditional, the semester began with the Presidential Address. On September 15th, William Hughes spoke on "The Banach Contraction Theorem". On September 29, Dr. Sara Mandell, who had spoken at the Induction Banquet in April, returned to give a fuller account of "The Mathematics of Ancient Civilizations". On October 20, Mehrdad Simkani, the Outstanding Scholar of the Chapter in 1983 and now a doctoral student in the Department of Mathematics, spoke about his work in his talk on "Asymptotic Distribution of Zeros of Certain Sequences of Polynomials". On October 27, Marcelle Bessman, Faculty Correspondent of the Florida Iota Chapter at the University of Tampa, discussed, "Georg Cantor's Work on Countability and the Continuum". On November 10, Dr. Andras Kroo, a visitor from the Mathematics Institute of the Hungarian Academy, spoke on, "What is Approximation Theory?" Pi Mu Epsilon sponsors these talks as a service to the University community. Members and non-members alike are cordially invited to attend.

NEW AND VISITING FACULTY

The Department is pleased to welcome new faculty Richard Darling, Gregory McColm and Boris Shekhtman. Andras Kroo and Maodong Ye are visiting.

Richard Darling received his Ph.D. from Warwick University in 1982 where he worked in stochastic differential geometry under K. D. Elworthy. His thesis was "Martingales on Manifolds and Geometric Ito Calculus." He has worked at the University of Bremen, Germany, the University of Colorado - Boulder, the University of California - Irvine, the University of Southern California, and the University of Minnesota. He is currently working on stochastic flows.

Andras Kroo is visiting from the Mathematics Institute of the Hungarian Academy where he received his Ph.D. in 1979, and where he works in approximation theory. His thesis was "Continuity Properties of the Best Approximation Operator."

Gregory McColm received his Ph.D. from the University of California - Los Angeles in 1986 where he worked in recursion theory under Yiannis Moschovakis. His thesis was "Simple and Simultaneous Recursive Fixed Points."

Boris Shekhtman received his Ph.D. from Kent State University in 1980 where he worked in approximation theory and functional analysis under Richard Varga. His thesis was "Interpolation in Abstract Space." He has worked at the University of Wisconsin - Madison, the University of Southern California, and the University of California - Riverside.

Maodong Ye received his Master's degree from Zhejiang University in 1981 where he works in approximation theory. His thesis was on cubic splines. He has since worked at Zhejiang University and is visiting USF as part of the Faculty Exchange Program between the mathematics departments of Zhejiang University and USF.

FACULTY PROFILE

Carol Williams

Excitement is what a person feels around Carol Williams. She is excited about her work, she is excited about the people she works with, she is excited about life in general. She joined the Department of Mathematics when the Astronomy Department moved to Gainesville in 1979; she was the only member of its faculty to remain at the University of South Florida. She feels that this is appropriate because, while mathematicians consider her an astronomer, astronomers consider her a

mathematician. She considers herself an astronomer with the heart of a mathematician.

Her bachelors degree from Conneticut College in New London is in Mathematics. She applied to Yale's Department of Mathematics for graduate study in Group Theory, but Yale had a severe cutback that year so she, as well as almost everyone else who applied, was turned down. She would have delayed graduate study but for Heinz Eichhorn, with whom she had worked during her undergraduate career and who was later Chairman of the Department of Astronomy at USF. Professor Eichhorn attended her college graduation and discovered the situation. He arranged for her to have an interview with Dick Brouwer, Chairman of the Astronomy Department at Yale, the very next day. Although she was reluctant to change fields, Professor Eichhorn, then and now, is not easily denied; Chairman Brouwer offered her acceptance at Yale.

Despite her misgivings, she found Astronomy at Yale to be the most exciting learning experience of her life. Celestial Mechanics became her field as she studied with Professor Brouwer. Later, on a Post Doctoral Appointment at Yale, she worked with Boris Garfinkel on the Ideal Resonance Problem. The problem of resonance is a classical unsolved problem in Dynamics. Its solution impacts on periodic solutions of differential equations, and on the stability of systems as well as their stochastic and ergodic behavior. Alan Jupp of the University of Liverpool, England, joined the group in the early 1970's and the three of them published a series of papers on the problem which have become the classics in this area.

She joined the Department of Astronomy at the University of South Florida in 1968 and immediately began work on a project suggested by Heinz Eichhorn, on finding a way to detect systematic errors in star catalogs from photographic observations of artificial satellites. This work was to occupy her, on and off, for the next six years. She ultimately showed that it was possible to separate errors in the star catalogs from errors in the satellite orbital parameters. In 1975, she was appointed to the Doctoral Research Faculty at the University of Florida, although she remained at the University of South Florida. She has been on over a dozen doctoral and masters committies in astronomy and mathematics at UF and USF.

Since 1979, she has been working on an immensely difficult problem in planetary theory. There are two areas of this problem she is studying. The first is to find a general solution for the orbit of Pluto. The second part of the Planetary Problem she is working on is that of charting the orbits of the planets for the past 200 million years. On these problems, she is working with Professor Andre Deprit and others at the National Bureau of Standards.

Professor Williams is one of six Editors of the journal "Celestial Mechanics", but will soon shift to being the Treasurer of the Celestial Mechanics Institute, which is responsible for the fiscal well-being of the journal. She serves as consultant to NASA at the Jet Propulsion Labratory and the Space Telescope Institute and to the Navy at the U.S. Naval Observatory. She has a Visiting Faculty appointment as a Mathematician at the National Bureau of Standards.

For all the honors her work has brought her, Carol Williams is a relaxed and charming person. She spends her free time at her beautiful home overlooking the Gulf in Palm Harbor. She is disapponted that, with all the graduate students in Astronomy at USF. She hopes this will change next year as her first resident graduate student arrives. He is currently working at Purple Mountain Observatory in China and has asked specifically to come to the United States to work with Professor Williams.

DEPARTMENT NEWS AND NOTES

Professor I. Ahmad was a guest speaker at Howard University, Washington, D.C. in May, and at the University of Central Florida in September.

Professor R. Darling, a new faculty member, attended the AMS Summer Research Conference on "Time Reversal of Markov Processes." He was an invited speaker at the AMS conference at Logan, Utah, in a special session on "Random Fields and Random Measures" on October 10-11. His current research is supported by a grant from the National Science Foundation.

Professor A. Goodman attended the International Congress of Mathematics at Berkeley, California, August 3-10, where he presented a talk on the zeros of the derivative of a rational function.

Professor M. Parrott attended the August meeting of the International Congress of Mathematics, where she spoke in a seminar on "Fixed Point Theory and Applications."

Professor D. Rose was honored as a Professor Emeritus at the Honors Convocation on October 17 at the Sun Dome.

Professor E. Saff was honored as the 1986 University Distinguished Professor at the Honors Convocation on October 17 at the Sun Dome. He gave a lecture on "A Problem in Approximation Theory with Applications to Orthogonal Polynomials," at the Second Annual International Conference on Orthogonal Polynomials in Segovia, Spain in September. He also wrote a chapter in volume 36 of the AMS Proceedings of Symposia in Applied Mathematics.

Professor C. Williams became president of the Division on Dynamical Astronomy of the American Astronomical Society, and consequently organized the May meeting of the Division where she presented a paper on "Perturbations near unit radius in the Restricted Problem of Three Bodies". In July and August, she visited the National Bureau of Standards, where she worked on first-order planetary theory with elliptic functions and a fanily of periodic solutions for resonances that have no small divisors, the latter with T. van Flandern and E. Wright. She has also been appointed treasurer of the Celestial Mechanics Institute.

Professor F. Zerla was elected president of the Florida section of the Mathematical Association of America and is therefore in charge of reporting regional meetings, including the Suncoast Regional meeting at Manatee Community College at Venice in December, where he will talk about "The Life and Work of John Wallis". He also gave a talk about "Events in the History of $\sqrt{-1}$"

MAA NEWS

Plans are being made for the annual meeting of the Florida Section of the MAA. The meeting will be held at

Florida Atlantic University in Boca Raton on March 6 and 7, 1987. Professor Frederick Hoffman of the Department of Mathematics at FAU is the contact person. Professor Ignacio Bello of the Ybor Campus of Hillsborough Community College is Program Chairman and would be interested to hear your ideas about what you would like to have on the program.

The Eleventh Annual Suncoast Regional Meeting of the Florida Section of the MAA will be held at the South Campus of Manatee Community College in Venice on Friday, December 5. Registration will begin at 2:30 with the Opening Address to start at 3:00. The format will be the same as in previous years, with nine 25 minute talks presented in batches of three at 4:00, 4:30 and 5:00. An informal dinner with jazz accompaniment will follow the formal meetings. Coordinators of the meeting are Professors Robert Campbell and Clifford Simpson both of the Venice Campus.

STUDENT NEWS AND ACTIVITIES

We congratulate the following students who graduated with degrees in Mathematics in the past year.

Fall 1985

B.A. Degrees:
Peter Cheng, Glen Copeland (Cum Laude)

M.A. Degrees:
Amy Kay Drew, Cecilia Swift
Ph.D. Degree:
Richard D. Mabry (Dissertation Title: Non-Linear Analysis in the Control of Space with Preassigned Responses. Dissertation Advisor: Prof. A. Kartsatos.) Dr. Mabry is working with Morrisound in Tampa.

Spring 1986

B.A. Degrees:
Robert Chase, Charles J. Dion, Julie Ellerbeck, Yong Sun Guida, Megumi Hook (Magna Cum Laude), David LaRussa (Magna Cum Laude), Hossein Mirani, David Orr, Andrea Osman (Summa Cum Laude), Brenda Jane Parker Susan Stelzmann, Cum Laude, Shawn Tybor

Summer 1986

B.A. Degrees:
Jay Domnitch, Adella Dukett, Stuart T. Jones, Joseph L. Kahl (Magna Cum Laude), Elizabeth Lewandowski, Richard Librizzi (Magna Cum Laude), Jose Lizardi, Michel R. Willis

M.A. Degrees:
Lisa Casner, Mark Clark, David Kaplan, Jeanne Valentine,

Summer 1986

Ph.D. Degree
Richard Stephens (Dissertation Title: Unique Factorization of Products of Multivariate Normal Distributions in n Dimensions. Dissertation Advisor: Prof. A. Mukherjea.) Dr. Stephens is now an Assistant Professor in the Department of Mathematics at Western Carolina University at Cullowhee.

A special welcome is extended to our new full-time graduate students. These students, and the schools from which they received their previous degrees are: Edward Caro (B.S., M.S., University of Puerto Rico), Barbara Duncan (B.A., Agnes Scott College), Brian Farrer (B.S., Eckerd College), Zhengyuan Guan (B.A., M.A., Shandong College of Oceanography, China), Jon Jones (B.S., Emory and Henry College), Xin Li (B.S., M.A., Zhejiang University, China), William Martin (B.A., Columbia University), Kuo-chen Pan (B.A., Guangzhou Teachers College; M.A. Jinan University, China), Lakshminarayan Rajaram (B.S., University of Mysore, India; M.S., New Jersey Institute of Technology), David Schuttig (B.S., Siena College), Gwiyeon Shim (B.S., Sungkyunkwan University, Korea; M.S., Wright State University), Ellen Stickell (B.S., Pennsylvania State University), Jung-Fang Sun (B.S., National Tsing Hua University, Taiwan; M.A., East Carolina University), Yan-hua Wang (B.A., Xianen University, China), Thomas Wangerman (B.S., Clarkson University), John Waters (B.S., Kent State University).

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