



# Quaternion

Department of Mathematics Newsletter

Vol. 1, Number 2

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## CHAIRMAN'S COMMENTS

I have just received in my office the final draft of the Mathematics and Statistics Program Review for the State University System (SUS) of Florida. It is a 154-page report compiled by three consultants who last November visited each of the nine SUS universities in Florida and reviewed their mathematics and statistics programs. This review was part of an ongoing review process carried on by the Board of Regents in which each discipline is reviewed periodically.

The consultants were Dr. Richard D. Anderson, Boyd Professor Emeritus at Louisiana State University; Dr. Richard L. Anderson of the University of Kentucky; and Dr. William L. Duren, Professor Emeritus at the University of Virginia. These consultants reviewed extensive self-study documents prepared by each mathematics and/or statistics department of the SUS. They also interviewed faculty, undergraduate and graduate students, and administrators at each university. Finally, they presented their findings to the Board of Regents at a recent meeting of the Board before submitting their final written review.

What is the purpose of the review? From the perspective of our Department, it gives us an opportunity to see from the eyes of external, reputable reviewers how we are doing. How are we doing relative to top-rated schools? What strengths do we have? What weaknesses? What areas need improvement? An honest evaluation may be painful or painless, but it will surely be beneficial.

What are the results? That is the content of the 154-page report. USF, as in the case of all other eight universities in Florida, has some strengths and some weaknesses in its mathematics and statistics programs. It will be the responsibility of the Department and

Administration to build upon the strengths and correct the deficiencies.

The Department of Mathematics is part of a young, emerging, and growing University. It takes time, commitment, and dedication of its faculty for a department to emerge into one of national prominence. USF, however, is at the right place at the right time to so emerge. In the words of the report, "A major strength of the USF and its Department of Mathematics is its service to the rich and growing Tampa-St. Petersburg region." USF is one of three universities in Florida (the University of Florida and Florida State University being the other two) that have been designated as major graduate centers in Florida. It is our task and continuing goal to serve the Tampa-St. Petersburg region with excellent undergraduate and graduate degree programs, cooperative programs with industry and local schools, and consulting services.

We are grateful for the review and eager to build upon our strengths, to remove our weaknesses, and strive for excellence. The people of the Tampa Bay area deserve nothing less.

## CENTER FOR MATHEMATICAL SERVICES

This Spring CMS has 11 students from the Colleges of Engineering and Natural Sciences participating in the Training Programs in Applied Science. These students are working on projects at GTE Data Services and Honeywell Aerospace that range from FORTRAN programming to laser communications. The students are supported by contracts with the companies. This type of on-the-job training complements the formal training they receive in their courses. In the past, over half of the students in the program have received job offers upon graduation from the firms at which they received training.

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## NEWSLETTER NAME

Since the quaternion is a four dimensional vector with real coefficients, this newsletter is therefore an information vector with very real information coefficients.

The chosen name was submitted by David Kerr who received the following prizes: the four volume works "The World of Mathematics" by James R. Newman and two bound volumes of the "Collected Works of J.J. Sylvester."

## FACULTY NEWS AND ACTIVITIES

Professor A.G. Kartsatos has been elected to the editorial board of the Honam Mathematical Journal.

Several members of the faculty participated in judging mathematics exhibits at the Hillsborough and Pasco County Science Fairs this Spring. Professors S. Isaak, F.L. Cleaver, J.H. Reed, and M.N. Manougian were among those serving as judges.

Professor W.R. Stark will be on leave from the department during the 1985-86 academic year. He will be working on a project that is a joint effort of Columbia University and Bell Labs. His role will involve fundamental research in distributed computing and applied research in distributed LISP, PROLOG, and artificial intelligence.

Professor C.A. Williams was elected President-elect of the Division of Dynamical Astronomy of the American Astronomical Society at the annual meeting in Austin, Texas March 27-29. Professor Williams presented a paper on new planetary theories. She will serve as President during the academic year 1986-87.

The National Science Foundation has awarded a grant for a project under the direction of Professor E.B. Saff

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entitled "U.S.-United Kingdom Cooperative Science: Rational Approximations (Classical Analysis)." The project is in collaboration with Professor M.J.D. Powell, University of Cambridge and Professor P.R. Graves-Morris, University of Kent.

The Mathematics Department will soon receive 25 computer terminals on line with the University mainframe computer. The terminals will be housed in PHY 209.

Professor S.J. Lee is organizing a special session at the annual AMS meeting to be held in New Orleans in January, 1986. The title of the session will be "Operator Methods of Optimal Control Problems."

Professor M.E. Parrott was a member of the organizing committee for the workshop on Control Systems Governed by Partial Differential Equations with Applications to Large Flexible Structures which was held in Tampa on March 4-8. This workshop was jointly sponsored by the National Science Foundation, Air Force Office of Scientific Research, and the National Aeronautics and Space Administration. Other mathematics faculty members who were invited to participate were Professors Lee, Nagle, and Rao.

Professor E.A. Thieleker will speak on the topic "Analysis on Lie Groups" in the special session on Analysis on Homogeneous Spaces, organized by Professor R. Kunze, at the AMS meeting in Mobile, Alabama, May 3-4.

Professor M.E. Parrott will travel to Maratea, Italy to participate in the NATO Advanced Study Institute on Nonlinear Functional Analysis and Fixed Point Theory, April 22-May 3.

Professor A.W. Goodman attended a celebration at Purdue University in March honoring Professor Louis de Branges for his proof of the de Branges' Theorem (formerly the Bieberbach Conjecture). Professor Goodman presented an invited address entitled "Some Old and New Problems."

Professor E.B. Saff is one of ten U.S. researchers in Approximation Theory selected to participate in the joint U.S.-China Seminar on Approximation to be held May 12-19, 1985 in Hangzhou, China. The National Science Foundation will support travel to China and during the week of the seminar Dr. Saff will be the guest of Peking University. During the week following the conference, Dr. Saff has been invited to lecture at Beijing Institute of Technology.

## STUDENT NEWS AND ACTIVITIES

The faculty of the Department of Mathematics recently approved the following changes in qualifying examination requirements for the Master's degree in mathematics: Instead of the previous three examinations required, students are now required to pass one qualifying examination to be chosen from the areas of Algebra, Real Analysis, Topology, or Mathematical Statistics. In addition, the qualifying examination requirement will be fulfilled by the defense of the Master's thesis for a student who pursues the thesis option. These changes were recommended by the Graduate Committee after an extensive search into Master's programs at the major universities in the country.

At the December, 1984 graduation, the students who received Bachelor's degrees in Mathematics were George Carless, Mark Clark (Summa Cum Laude), Karen Ludwick, Margaret Prather (Summa Cum Laude), and Kurt Van Etten. Master's degrees in Mathematics were received by Douglas Abernathy, Gabor Belovari, and Virginia Clarson.

Several graduate students will be participating in conferences this summer. Debby Levinson will present a paper entitled "An Exact Formula for the Effects of Resistor Geometry on Current Noise" at the Fifth International Conference on Mathematical Modelling to be held July 29-31, 1985 at Berkeley, California.

Mrs. Kaye Shannon and Mr. Mehrdad Simkani will spend a portion of this summer working on their dissertations at Cambridge University, England, where their adviser, Dr. E.B. Saff, is conducting collaborative research on approximation theory and numerical analysis. The graduate students will be staying at Pembroke College and have office facilities at the Cambridge Division of Applied Math and Theoretical Physics. They will also attend a conference on approximation theory in July at the Royal Military College in Shrivenham, England.

Graduate students are encouraged to attend faculty research seminars and can earn 1 hour of graduate credit for active participation in a seminar. Several students participated this Spring in seminars in the areas of approximation theory and dynamical systems.

## MAA NEWS

The Mathematics Department participated in the Annual Meeting of the Florida Section of the MAA which was held at Stetson University in DeLand in early March. Dr. Mary Parrott presented an Invited Address on "What's the Delay? An Introduction to Differential Equations Involving Delays." Dr. Ernest Thieleker contributed a paper on "The Geometry and Group Theory of Special Relativity." Dr. Fredric Zerla again organized the Pi Mu Epsilon Undergraduate Paper Session as he has at these meetings for the past nine years. Dr. Zerla also served as Program Chairman.

Three outstanding mathematicians spoke at the meeting. Professor Daniel Gorenstein of Rutgers University spoke on the "Classification of the Simple Groups" and his part in solving this problem. Professor Lynn Steen of St. Olaf College, President of the Mathematical Association of America, told of the many activities and some of the problems of the Association. Professor Richard V. Andree of the University of Oklahoma, a pioneer in the use of the computer as an educational device, told of "Some Problems Neither My Computer Nor I Can Solve - YET." Professor Andree's visit was sponsored by USF.

The Mathematics Department also hosted the Ninth Annual Suncoast Regional Meeting of the Florida Section of the MAA on December 7, 1984. The Arrangements Committee consisted of Drs. Kenneth Pothoven, Don Lichtenberg, Frank Cleaver, and Walter Williams, with Fredric Zerla, Coordinator. Participants from USF included Dr. Leon Mandell who welcomed the attendees, Dr. Frank Cleaver who gave the opening address on "The Essence of Mathematics," and Dr. Fredric Zerla who spoke on "Gilles Personne de Roberval, a XVIIth Century Contributor to the Calculus." Invitations were sent to mathematics teachers in all high schools, two-year colleges, and colleges in the 15 county area served by USF. A total of 64 people registered for the Meeting. The program included 10 talks of a mathematical nature, all by teachers from the region. The evening ended with a banquet at the Faculty/Staff Lounge. Members of Sigma Alpha Iota Fraternity provided music after the banquet.

## PI MU EPSILON NEWS

Pi Mu Epsilon Fraternity, the Mathematical Honor Society, welcomed four new

members at the Induction Banquet on April 4. The students chosen for this honor were Slavek Tom Kshonze, Peter Cheng, Glen Fields Copeland, Jr., and Michael T. Cronin. Professor James Bell of the Department of Philosophy spoke at the banquet on "Numbers in the Real World."

Two members were chosen for the "Outstanding Scholar Award." This honor is given to the senior who has the best record in mathematics at the University. This year, Mark A. Clark and Rockford Rathgeber had each performed so well that the Chapter chose to recognize both. Mark, who graduated in December, 1984, and Rockford, who graduates this Spring, will each receive a plaque and will have his name engraved on the permanent plaque which hangs on the first floor of the Physics Building. Mark has been invited to address the Chapter during Honors Week as part of the Mathematics Honorary's participation in the celebration. As President last year, Rockford addressed the Chapter several times.

The Florida Epsilon Chapter continues to present speakers on various aspects of mathematics not usually addressed in a class. Professor Kent Nagle, Director of the Center for Mathematical Services, spoke on "What's the Alternative?" Dr. Edwin Clark discussed "Error-Correcting Codes." Professor Kevin Dove of the University of Tampa told of his computer analysis of the game of Monopoly. Professor Richard V. Andree of the University of Oklahoma, past national President of Pi Mu Epsilon Fraternity, spoke of the use of the computer in problems in Number Theory. Dr. Arunava Mukherjea, USF Distinguished Professor in 1983, spoke on "Norms in the Space of Continuous Functions on the Unit Interval."

## FACULTY PROFILE

Mention the fact that this faculty member was once a chemist at Crown Can Company and not many people would be able to guess who he is. Add the fact that he was Chairman of Mathematics at USF for three years beginning in 1963 and some faculty and former students would know who this is. Throw in the clue that this man loves to play golf; and moreover, is quite adept at it and many more would recognize who this individual is. But add the fact that he served as the Secretary-Treasurer of the Florida Section of the Mathematical Association of America (MAA) from 1969-82 and almost all in the mathematical com-

munity throughout Florida know this faculty member to be Professor Frank Cleaver.

He is indeed Frank Cleaver. Born February 3, 1925, in Palm, PA, Professor Cleaver served in the U.S. Army from 1944-46, received a B.S. in Biochemistry in 1948 from Penn State University, a M.S. in Mathematics from the University of Miami in 1955, and his Ph.D. in Topology from Tulane University in 1960. In the interim between his B.S. degree and his M.S. degree, Professor Cleaver was both a chemist and a junior business partner in Philadelphia.

Professor Cleaver has been a member of the faculty at USF since 1960, except for serving one year at the University of Kentucky as Assistant Professor in 1961-62. During this time he has established himself as a highly respected and valuable member of the Department - serving as Chairman, as a member of various committees, as an effective teacher, as advisor, and as friend. He has also been a leader in the mathematical community in Florida by helping organize the Florida Section of MAA in 1969.

Dr. Cleaver is retiring from full-time service to USF at the end of the current academic year. His retirement means the passing of an era when the Department was served by its charter faculty members. We owe a debt of gratitude to Frank Cleaver for serving the Department and USF so admirably during the formative years of our Department. It is because of the hard work and dedication of Frank Cleaver and others that the Department has had such a solid foundation on which to build. His full-time service to USF will be missed indeed.

## ALUMNI CORNER

For political reasons this future mathematics professor came to the United States from Cuba in the early 60's. Even though he had already taken classes at the university level in Cuba, he was placed in the tenth grade at Jefferson High School in Tampa. The reason? He "could not speak English." He finished high school that same year. In fact, George Garcia, Dean at Jefferson, recommended this young man for an academic scholarship to the University of South Florida.

He was admitted to the University of South Florida on a scholarship. Ambition and hard-work paid off: he earned a 3.7 GPA and received his Bachelor's (1965) and Master's (1967) degrees in mathematics.

From 1964 to 1967 he was an Instructor and served as Chairman of the Mathematics and Physics Department at Tampa Technical Institute. He developed their math program and was instrumental in getting it accredited. After receiving his Master's degree he became an instructor and taught at USF until 1971. He then joined the faculty of Hillsborough Community College and served as Chairman of the Mathematics Department until 1980. Although currently employed by HCC, he teaches developmental mathematics for HCC on the USF campus.

A team teaching experience at USF with Professor Jack Britton led to collaboration on a textbook. He and Britton each taught half of the course and compared notes. "When we realized we were on the same wavelength, we agreed to collaborate on a textbook," he remarks. That first book, "Topics in Contemporary Mathematics," is the second bestselling textbook ever published by Harper and Row. It was even translated into Chinese.

So began a writing career which includes the following textbooks: "Contemporary Business Mathematics," "Algebra For College Students," "Contemporary Elementary Algebra," "Contemporary Technical Mathematics," and, with Jack Britton, "Beginning Algebra," "Contemporary College Algebra," and "Contemporary College Algebra and Trigonometry." He has also published three research papers.

In March, 1983, this alumnus was invited to speak at the Mathematical Association of America meeting as part of a Visiting Scholar Program. This is an honor accorded few professors from community colleges. He has served as Vice-Chairman of the Florida Section of the MAA and on its Committees on Two-Year Colleges and on Short Courses. He is a reviewer for the TYCMJ and has lectured under the auspices of the Visiting Scholar Program of the Florida Academy of Sciences. He is a member of the MAA, AMATYC, and of Pi Mu Epsilon.

As a teacher, the professor's classroom manner is much the same as it was when he was a student. He radiates enthusiasm and initially wins over his students by passing out a printed autobiographical hand-out that even includes details about his IQ. Its humorous and friendly tone serve to create an instant rapport with all his students. An example of its contents: "He was ejected from the baseball team for keeping illicit statistics on the players ... he failed freshmen mathematics as

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well . . . due to circumstances beyond his control, he completed high school in one year in the U.S. . . . he ranked 17 in a class of 300 and was the only one among the first 33 that was not a member of the honor society."

Please meet the unorthodox, prolific, and personable Professor Ignacio Bello.

### DEPARTMENTAL COLLOQUIA

The following colloquia were presented in the Department during Semester II of 1985:

DR. LOTHAR REICHEL, University of Kentucky, "A Fast Method for Solving Integral Equations of the First Kind."

DR. DMITRY KHAVINSON, University of Arkansas, "Rational Approximation and Plane Geometry."

DR. JAYARAM SETHURAMAN, Florida State University, "Large Deviations in Probability."

MR. PATRICK SHEPPARD, Cornell University, "The Dirichlet Principles and Finite Energy Solutions of the Discrete Dirichlet Problems."

DR. MURALI VARANASI, University of South Florida, "Generalized Burton Codes for use in Computer Memory Reliability."

DR. RICHARD ANDREE, University of Oklahoma, "Exploring Divisor Chains with a Microcomputer."

DR. MICHAEL COLVIN, Northern Arizona University, "Symplectic Geometry and Arnold's Conjecture."

MR. DANIEL HITT, Stanford University, "Hardy Spaces on the Annulus."

DR. VILMOS TOTIK, Bolyai Institute, "K-functionals and their Applications."

DR. H. STAHL, Technical University of Berlin, "Pade Approximants and Orthogonal Polynomials."

DR. EDGAR R. LORCH, Columbia University, "Certain Compact Spaces and Their Homeomorphism Groups."

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This Summer CMS is conducting five six-week programs for gifted secondary school students. High school students receive high school credit for participating and may receive college credit from USF. The programs offered on the Tampa campus are the Mathematics and Science Programs for Gifted High School and Junior High School Students and the Biomedical and Life Science Program. On the St. Petersburg campus: Mathematics and Science Program for Middle School Students and the Physical Science Program.

*Events, activities, programs, and facilities of the University of South Florida are available to all without regard to race, color, sex, religion, national origin, Vietnam or disabled veteran status, handicap, or age, as provided by law and in accordance with its respect for personal dignity.*

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