CHAIRMAN'S COMMENTS

In an earlier article of the Quaternion I wrote about mathematics being an extremely complex discipline that has many essential traits in common with art and gave some characteristics about mathematics that make mathematics art. Additionally and perhaps more importantly, mathematics also has essential traits in common with both experimental and theoretical science.

A recent publication by the Mathematical Sciences Education Board of the National Research Council entitled Reshaping School Mathematics develops nicely the idea that mathematics is a science. In describing mathematics the report states the following. "We begin with a simple approximation: mathematics is a science. Observations, experiment, discovery, and conjecture are as much part of the practice of mathematics as of any natural science. Trial and error, hypothesis and investigation, and measurement and classification are part of the mathematician's craft and should be taught in school. Laboratory work and fieldwork are not only appropriate but necessary to a full understanding of what mathematics is and how it is used. Calculators and computers are necessary tools in this mathematics lab, but so too are sources of real data (scientific experiments, demographic data, opinion polls), objects to observe and measure (dice, blocks, balls), and tools for construction (rulers, string, protractors, clay, graph paper)."

If mathematics is a science, what then is mathematics a science of? "As biology is a science of living organisms and physics is a science of matter and energy, so mathematics is a science of patterns." How is mathematics the science of patterns? "By classifying, explaining, and describing patterns in all their manifestations-number, data, shape, arrangements, even patterns themselves-mathematics ensures that any pattern encountered by scientists will be explained somewhere as part of the practice of mathematics."

Anyone familiar with even elementary concepts of mathematics can understand how mathematics can be described as the science of patterns. Consider the regularity and order of numbers exhibited in arithmetic or even the disorder in the pattern of primes. Consider the patterns exhibited in geometry such as distinguishing properties and classifications of geometrical shapes. Think of the patterns of data exhibited in statistics, a subject which is usually thought of as studying disorder. Students of other areas of mathematics such as number theory, topology, analysis, and algebra can surely agree that the recognition and study of patterns is really what mathematics is about.

The recognition that mathematics is a science of patterns has important consequences in the teaching of mathematics. For example, rather than viewing mathematics as a set of rules for calculation, students should be taught to actively participate in the learning process and to see mathematics as a dynamic resource to understand the many patterns and order of the real world. Mathematics should be taught as a discipline where students are encouraged to explore, make conjectures, experiment with conjectures and use available tools such as computers and calculators to discover patterns.

Based upon the perspective of mathematics being the language and science of patterns, much more is said and presented in Reshaping School Mathematics . I recommend the publication to anybody interested in the teaching of mathematics.

BOR REVIEW

Last February the department was reviewed by a team of outside consultants as part of a five-year cyclic review mandated by the State of Florida Board of Regents. Visiting the department were Lead Consultant Peter Hilton of the State University of New York at Binghamton, Statistics Consultant Richard L. Andersen of the University of

Kentucky, and Local Consultant Zuhair Nashed of the University of Delaware.

Recently the draft report of the consultants was submitted to the Department for review. The report was complimentary in stating that "there has undoubtedly been a substantial strengthening of the department since the last review..." Cited among the improvements were the hiring of "very promising" new faculty, significant growth of the graduate program with "some very good" students, comprehensive curricular revision ensuring that students are well grounded in core areas of mathematics, and the establishing of the Institute for Constructive Mathematics.

Also some weaknesses were mentioned and recommendations were given for further strengthening of the Department. Among the most prominent needs cited were space and faculty needs. The report characterized the space problems of the department as "grave" stating in fact that the department needs a new building. Additional faculty are needed to meet increased teaching demands for a growing student population and graduate program.

The recommendations of the report are welcome and not surprising. As the University and Department continue to grow in size and stature, it is natural to expect that more space and faculty will be required.

BULGARIAN EXCHANGE PROGRAM

Last year the Department of Mathematics established an exchange program of faculty and students with the Mathematical Institute of the Bulgarian Academy of Sciences in Sofia, Bulgaria. As part of this exchange Professor Pencho Petrushev is visiting this Department during Semester I and is engaged in teaching and research activities. Professor Petrushev's research interests are in analysis and approximation theory. He is

visiting the U. S. with his wife and daughter.

Professor Richard Darling of the Department has been invited to visit the Bulgarian Academy sometime during the Spring of 1991. Dr. Darling would give a series of lectures in his area of interest of stochastic flows and stochastic differential equations and consult with other probabilists in Bulgaria.

NEW FACULTY

The Department welcomes as a new faculty member this year Professor Yuncheng You. Dr. You received his Ph.D. in 1988 from the University of Minnesota under Professor Lawrence Markus. He received his B.S. and M.S. degrees from Fudan University in the Peoples Republic of China. After receiving his Ph. D. in 1988, he spent one year at Purdue University as a Research Assistant Professor and one year at the University of Minnesota as a Visiting Assistant Professor.

Professor You's research interests include infinite dimensional dynamical systems and control, applied partial differential equations, and applied mathematics. His dissertation was on Stabilization, Optimal Control, and Inertial Manifolds of Infinite Dimensional Systems. Dr. You is already the author of about fifty research papers. The Department is delighted to have him as one of its faculty.

DEPARTMENT NEWS

Dr. R. Darling gave an invited talk at the SIAM conference on Dynamical Systems in Orlando on May 11. On May 25, he participated in a colloquium at Universite Louis Pasteur in Strasbourg, France, and on May 27 gave a contributed talk at the Lyapunov Exponents Conference at Oberwolfach, Germany. Dr. Darling also participated in a colloquium at Universitat Breman in Germany on June 7, and on September 5 gave an invited talk at the 19th Conference on Stochastic Processes in Eisenbach, Germany.

Dr. M Ismail gave a talk at the 3rd International Conference on Orthogonal Polynomials in Erice, Italy in June. Dr. Ismail also gave colloquium talks at the American University in Cairo, Egypt, at INRIA at Sophie Antipolis, at the University of Nice in June, and at the Center for Mathematics and Computer Science in Amsterdam in August. During June and July, Dr. Ismail was a visiting professor at the University of Paris.

Dr. G. M. McColm visited Haverford College in Philadelphia, Pennsylvania last May where he spoke on pebble games and Ramsey Theory. He also gave a talk at the SIAM Conference on Discrete Mathematics in June.

Dr. A. Mukherjea presented an invited talk in the conference on Probability Measures on Groups at Oberwolfach, West Germany on November 8. He also presented an invited talk at the department of Mathematical Statistics at the Indian Statistical Institute on November 12.

Dr. C. Williams received the Undergraduate Teaching Enhancement Award at the Honors Convocation in October. In May she was a speaker at the USF Center for Excellence Honor Society Banquet and during July and August she served as consultant to the Nautical Almanac Office, U. S. Naval Observatory and to the Applied and Computational Mathematics Division of the National Institute of Standards and Technology on the theory of the orbit of the moon and perturbation methods for nonlinear dynamics. Dr. Williams was also one of three lecturers chosen for the Brain Event, a lecture program jointly sponsored by the Provost's Office and the Tampa Tribune.

Dr. Y. You was invited to present "Invariant Manifolds for Retarded Semilinear Wave Equations" at the colloquium of the Center for Applied Mathematics at Cornell University on December 7.

STUDENT NEWS

Nalina Suresh was selected by the Computer Science and Mathematics Section of the Florida Academy of Sciences to receive an Outstanding Student Paper Award for her presentation at the 54th Annual Meeting held at Florida Institute of Technology, March 22-24, 1990. Her paper was entitled, "Weibull Model for the Prediction of Software Reliability Using Bayes Empirical Bayes Approach".

B.A. in Mathematics
Ronnie Beck, Amy Drawdy
Hyon Kim, John L. Martin, Jr.
K. Beth Robertson, Gene Rowell

M.A. in Mathematics
Megumi Hook
Thayaparan Sabapathy

Ph.D. in Mathematics
Zhengyuan Guan, "On Operators of Monotone Type in Banach Spaces"; major professor, A. Kartsatos.

David Kaplan, "Applications of Nonlinear Analysis to the Control of Space with Preassigned Responses"; major professor, A. Kartsatos.

Kuo-Chen Pan, "Some External Problems in Approximation Theory"; major professors, E. B. Saff and B. Shekhtman.

Jaedong Shim, "Optimal Control Problems in Delay Differential Equations"; major professor, S. J. Lee.

Xinlong Weng, " Approximation Methods for Solving Nonlinear Equations in Banach Spaces"; major professor, A. G. Kartsatos.

CENTER FOR MATHEMATICAL SERVICES

The highlights for the Center for Mathematical Services so far this year have been the Summer Programs, the Lecture Series, and a reunion for participants in the summer programs.

Four annual summer programs for gifted secondary students were held again this past summer, three on the Tampa campus, and one on the St. Petersburg campus. They had a combined attendance of 216 students, who studied not only Mathematics and Computer Science, but also Biochemistry, Chemistry, Engineering, Geology, Marine Science, Molecular Biology and Physics. The outstanding students received Awards of Excellence at the Awards Programs held at the end of the six week sessions.

The Lecture Program teams faculty members from USF and Hillsborough Community College with members of local businesses to speak to secondary students in their mathematics classes. In the academic year 1989-90, the CMS and the Center for Excellence arranged for 8 faculty members and 4 business representatives to give 130 lectures in 37 schools to 4800 students, covering 7 counties in the area served by USF. The program for this academic year was started with a breakfast for the lecturers. All indications are that this year's program will be as full as last year's.

In January of 1989, the CMS sponsored the first reunion of students who have attended the Summer Programs. The first such program was held in 1979 on the St. Petersburg campus, and the CMS has followed the progress of hundreds of gifted students as they have progressed through college, and sometimes graduate school, to become successful adults. We were delighted to see 86 former students come back to meet the classmates and teachers that, although they knew for perhaps only six weeks, they have remembered for many years. Parents and teachers were also invited to the reunion, and each guest was invited to take a tour of five USF science laboratories, where faculty members gave short descriptions and demonstrations of their research. Dr. Carol Williams gave an illustrated lecture on NASA's exploration of the outer solar system, featuring some of the new pictures of Neptune and its satellites that had been obtained by Voyager a few months earlier. The offices of the Dean of Natural Sciences and Marriott Food Services jointly sponsored a box lunch, giving old friends time to relax, reminisce, and catch up with each other. After the luncheon, a formal presentation of the new four year special scholarship award for summer program alumnae was presented to Daniel Jelsovsky.

A similar event is being planned for December of this year. If you were not contacted for last year's event, it may be that we do not have your address. Please send it to Dr. Kent Nagle, Director of the Center for Mathematical Services, PHY 114, University of South Florida, 4202 E. Fowler Avenue, Tampa, FL 33620-5700.

A.M.S. SECTIONAL MEETING

The Department of Mathematics will be hosting the Southeastern Sectional Meeting of the American Mathematical Society during March 22-23, 1991. Special sessions organized by our faculty members and the names of the invited speakers are listed below.

1. Mathematical Issues in Biologically-Motivated Computing
Organizers: Drs. E. Clark, J. Liang, G. McColm, J. Pedersen, and R. Stark.

Speakers: Drs. B. Huberman, C. Langton, L. Goldfarb, T. Head and S. Yu.

2. Nonlinear Boundary Value Problems

Organizers: Drs. M. Parrott and K. Nagel.

Speakers: S. Busenberg, K. Cooke, C. Cosner, A. Edelson, W. Fitzgibbon, J. Goldstein, C. Gupta, J. Haddock, R. Kannan, T. Krisztin, M. Nkashama, R. Nussbaum, G. Rieder, S. Waggoner, and T. Ward.

3. Operator Methods for Control Problems

Organizer: Dr. Y. You

Speakers: E. N. Chukwu, R. Fennell, J. E. Lagnese, I. Lasiecka, E. B. Lee, S. Lenhart, W. Littman, L. Markus, N.Z. Nashed, R. Datko, A.N.V. Rao, E. O. Roxin, D. L. Russell, R. Triggiani, Y. You, B. Zhang.

4. Probability on Algebraic and Topological Structures

Organizers: Drs. J. Glover and A. Mukherjea.

Speakers: (tentative)
R. Darling, P. Diaconis, J. Glover, O. Kallenberg, V. Maximov, A. Mukherjea, M. Rao, M. Rosenblatt, L. Watkins.

5. Approximation Theory

Organizers: Drs. R. DeVore, E. B. Saff, and B. Shekhtman.

Speakers: (tentative)

R. A. Lorentz, P. Nevai, R. Bojanic, L. Schumaker, B. Baishanski, C. Micchelli, E. W. Cheney, D. Zwick, S. Riemenschneider, Zeev Ditzian, C. de Boor, A. Ron, D. Leviatan, A. Cavaretta, R. S. Varga, M. Berger, J. Geronimo, S. Demko, R. C. Sharpley, B. Jawerth, J. Ward, C. Chui, E. Passow, D. Newman, F. Deutsch, D. Phillips, B. Lucier, X. M. Yu, W. Madych, B. Chalmers, G. G. Lorentz, V. Totik, T. Erdelyi, X. Li, H. H. Gonska, C. Cottin.

INSTITUTE OF CONSTRUCTIVE MATHEMATICS

Professors R. Darling and E. B. Saff, and Graduate Assistant Charles Godfrey, have continued to work on a "Statistical Frequency Hazard Model for Hurricane Wind Speed and Surge Elevations" at two nuclear power plant sites in the South of Florida. The Institute has received $102,500 from Florida Power and Light Company for this two-year project. Already one article has been accepted for publication in the Journal of Climate as a result of this work. Recently the Institute has also received a grant from Martin Marietta, Inc., for mathematical image analysis.

IN MEMORY OF

On November 26, the department was saddened by the death of a respected colleague, Dr. Sung J. Lee. A native of Korea, Dr. Lee received his B. Sc. from Jeonbuk National in Korea, his M.A. from Boston College, and in 1972 his Ph.D. from McMaster University in Canada. Dr. Lee joined the faculty of USF as an associate professor in 1981 and was promoted to full professor in 1986. His research interests included ordinary differential equations (spectral theory), unbounded linear operators, general inverses, ill-posed problems, deterministic or stochastic control problems. He had over forty published research papers and edited one book. He was a member of the American Mathematical Society and was a deacon in the Korean Presbyterian Church. He is survived by his wife Amy, a son John, two daughters, Ann and Susan, his parents, and a brother. The department extends its heartfelt sympathies to his family.

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