CHAIRMAN'S COMMENTS

The **Tampa Tribune** recently reported on a national study conducted by the Labor Department entitled the (Labor) Secretary's Commission on Achieving Necessary Skills or SCANS. That commission researched what skills employers require in graduates from the school system.

According to the **Tribune**, the report indicates that all types of companies, from banks to industrial manufacturing companies, say they are frustrated because many times they cannot find workers for entry-level positions who can write a simple memorandum or do basic mathematics. However, the SCANS report identifies two major components besides reading, writing and arithmetic that should be part of the curriculum according to employers. They are (1) the teaching of personal qualities such as responsibility, self-esteem, and ethics, and (2) the teaching of "thinking" skills by which students will learn how to think creatively and solve problems.

It is in the latter of these two roles that I think a mathematics curriculum should play a particularly key role. It involves what has been termed in recent years the teaching of "critical thinking".

DEPARTMENT NEWS

Dr. R. Darling visited the University de Provence, Marseilles, France from December 14 to December 23 to collaborate on research in probability. Along with Dr. E. Saff and Dr. B. Galperin (Marine Science) Dr. Darling has received a $138,000 grant from Florida Power and Light for Storm Surge Modeling at Nuclear Power Plant Sites.

Dr. G. McColm gave a talk entitled "The Great Barrier Reef of Computer Science" at the MAA Suncoast Meeting at St. Petersburg Jr. College on December 6. On February 2, he gave a talk entitled "Games Logicians Play" at the 23rd Southeastern Conference on Combinatorics, Graph Theory, and Computing at Florida Atlantic University, and on March 13 he gave an invited talk on "Partition Relations on Infinite Posets" in the special session on Combinatorial Problems as Partially Ordered Sets at the 872nd meeting of the AMS at Tuscaloosa.

Dr. A. Kartsatos, Dr. A. N. V. Rao and **Dr. C. Tsokos** are members of the Tampa advisory committee for the World Congress of Nonlinear Analysts. The Congress will be held in Tampa during August 19-26, 1992. Over 1500 scientists from numerous countries are expected to participate. Drs. Rao and Tsokos are the organizers of two special sessions, one on "Nonlinear Stochastic Systems" and another on "Nonlinear Relativity Models." Dr. Kartsatos is the organizer of a special session on "Accretive and Monotone Operator Theory."

Dr. Y. You gave an invited colloquium talk on "Global Dynamics and Control of Nonlinear Evolution Equations" at the University of Central Florida on February 4.

STUDENT NEWS

Two USF students, Daniel Jelsovsky and Suzanne Joseph, have been awarded Mathematics Department Scholarships. These scholarships provide each recipient with $500 to use for educational expenses incurred at USF.

Since the last issue, the following degrees have been awarded:

B.A.. in Mathematics
John Scott Chandler
Nancy Helen Cotter
Christina Therese Dwyer
Michael Irwin Nadler
Yvette Fregeau Parenteau, Cum Laude
Bruce Alan Roberman
Stuart Conrad Swope

B.A./M.A. in Mathematics
Scott James Goodwin
Christopher Bishop Pedonesi

M.A. in Mathematics
Jun Cao
Xiaoping Liu
Huangiang Shi

CENTER FOR MATHEMATICAL SERVICES

This summer, the Center for Mathematical Services will again conduct three programs for gifted secondary school students on the Tampa campus from June 11 through July 24. This will be the thirteenth year for the Mathematics and Engineering Program, the eleventh year for the Biomedical and Life Science Program, and the ninth year for the Mathematics and Science Program. The deadline for applying is May 15, 1992. For additional information, call the Center at (813) 974-4068.

The Center's "Mathematics in Today's World" lecture program is doing well. To schedule a lecture, call Danielle Bagarella at (813) 974-4068.

INSTITUTE FOR CONSTRUCTIVE MATHEMATICS

The Institute for Constructive Mathematics has been awarded $138,000 from Florida Power and Light Corporation for the study of hurricane wind speeds and surge elevations. The study will combine a wind speed model developed by Prof. Richard Darling and a surge model developed by Mellor and Blumberg at Princeton. The latter model is being investigated by Prof. Boris Galperin of the USF Department of Marine Science. The integration of these two models should provide a very powerful tool for hurricane risk assessment.

Hercules Defense Corp. has awarded the Institute $20,000 for the study of wavelet applications to object recognition. The principal investigators for the grant are Professor J.F. Pedersen and Professor E.B. Saff. In conjunction with researchers at the University of South Carolina and at Purdue, methods of nonlinear approximation theory will be used to develop an algorithm for analyzing laser imagery.

MAA NEWS

The Twenty-fifth Annual Meeting of the Florida Section was held at the University of North Florida in Jacksonville on March 6 and 7. Participants from USF included Dr. Kenneth Pothoven, who attended the SUS Chairs Meeting, and Dr. Fredric Zerla, who presided at the Student Paper Session. Dr. Zerla chaired the Awards Committee for the Section this year.

STUDENT CLUBS

The Florida Epsilon Chapter of Pi Mu Epsilon and the USF Student Chapter of the MAA continued their joint meetings. At the fifth meeting of the year, Dr. Richard Darling spoke on "Minimal Surface and Probability". The sixth meeting featured Dr. Carol Williams in a discussion of her work with "Gylden Systems: Dynamics with a Time Varying Gravitational Constant". The seventh meeting was also the opening meeting of the Spring Semester. These meetings feature an address by the President of the Student Chapter. This year, President Christopher Turner spoke on "Fractal Compression." The advisor of both clubs, Dr. Fredric Zerla spoke at the eighth meeting on a topic from mathematics history, "The Quadrature of Lunes". Graduate student Wes Skinner spoke at the ninth meeting on his application of computer techniques to old problems in "Using LISP on Knots". The

properly infuse critical thinking into the mathematics curriculum. In the near future, they hope to conduct a workshop on critical thinking and the infusion of it into the mathematics curriculum to benefit the general college student, and according to the study cited above, make students more employable.

SPRING COLLOQUIA

Chaotic Properties of Solutions to Time-Dependent Schroedinger Equation, presented by Kostya Oskolkov, Queens University, Kingston, Ontario, Canada.

Geometry of Orders, presented by Gary Spoar, University of Guelph, Guelph, Ontario, Canada.

Rational Biorthoganality and Continued Fractions, presented by David Masson, University of Toronto, Toronto, Canada.

Some of My Favorite Problems in Graph Theory, presented by Paul Erdos, AT&T Bell Labs, Whippany, New Jersey.

The Beginning and End of the Universe, presented by Lawrence Krauss, Yale University, New Haven, Connecticut.

The Maximum Principle for Some Cooperative Elliptic Systems, presented by Jacqueline Fleckinger, University of Tolouse, France.

Dynamics of Quadratic Polynomials, presented by John Hubbard, Cornell University, Ithaca, New York.

Numerical Computation of the Weyl-Titchmarch M_λ Functions, presented by Malcolm Brown, University of Wales, Wales, England.

Products of Random Matrices, presented by Ilya Goldshied, MIT-Cambridge, Cambridge, Massachusetts.

clubs are again sponsoring the Hillsborough County Math Bowl Competitions. That of December 18 drew approximately 200 high school teachers and students to the University Center. The next, on April 28, is expected to be even larger.

The Florida Chapter of Pi Mu Epsilon is pleased to announce that its Outstanding Scholar Award winner is graduating senior Suzanne Joseph. Suzanne is a mathematics major who has a 4.00 grade point average in three and a half years at USF. Plans are being made for the Pi Mu Epsilon Induction Banquet on April 24, at which 21 new members will be inducted into the Honorary.

ALUMNI NEWS

Ronnie L. Beck (B.A. 1990) is currently employed by Southwest Space Systems, Inc. and also teaches astronomy for USF's Division of Lifelong Learning. He has published one book and is working on two more.

Daryl L. Schrader (M.A. 1973-Physics) is a Professor of Math and Astronomy at St. Petersburg Junior College. He also serves as adjunct astronomer at USF Sarasota and St. Petersburg. In addition, he writes a monthly astronomy column for the St. Petersburg Times and conducts various media presentations.

FACULTY PROFILE

Dr. Mary Parrott was born in 1942 and lived as a child in Texas and West Virginia. She credits her father, a chemical engineer, with giving her the encouragement to study technical subjects. She is married to a pilot, Fred, and they have two sons, Casey and Chuck, and a one-year-old grandson, Chase.

Dr. Parrott received her B.S. in Engineering Sciences from Purdue University in 1964, and her M.S. in Aeronautical Engineering from Purdue in 1965. She attended graduate school on an Amelia Earhart fellowship. Her early research interests were orbit mechanics, and her early goal was to be part of a space shuttle crew. After working several years as an engineer, building up her flight time as a private pilot, and moving around the country with her husband who was in the Air Force, she realized that she needed a doctoral degree to be competitive in the space program. So, she began taking graduate classes at Memphis State University. Gradually, her interests switched more to mathematics, and in 1979 she received her Ph.D. in mathematics. Dr. Parrott came to our department that year, where she is now an Associate Professor.

Starting from her dissertation research, one of Dr. Parrott's main research interests has been in the area of delay differential equations. These equations model physical phenomena where the present state of a certain quantity depends upon information about the state at an earlier time. In 1987, she spent the year at Vanderbilt University as a visiting scholar on an NSF grant provided by the Research Opportunities for Women program. She became interested in applying the theory of delay differential equations to solve problems in population dynamics. One of Dr. Parrott's current research projects involves the study of certain equations which model cell growth. Understanding how cancer and normal cells grow can have important applications in chemotherapy treatment. She is also currently working on problems involving the dynamics of the Hodgkin-Huxley system which models neural transmission.

For the past three summers, Dr. Parrott has operated a hiking guide business in Colorado. Besides hiking, she is also an avid whitewater canoeist (she plans to canoe the Middle Fork of the Salmon River in Idaho this June), skier, and windsurfer. She is an outdoor leader with the Sierra Club and leads hiking, canoe, and sea kayak trips.

COURSE REVISIONS

In response to developments in Mathematics-Education, three mathematics courses have undergone renovations. The State of Florida now requires that a student have completed a course in Number Theory and in the History of Mathematics in order to obtain a Teaching Certificate in Mathematics at the Secondary Level. Consequently, the College of Education at USF now requires such courses for the Bachelors Degree in Mathematics Education. The Mathematics Department has taught courses in these subjects for many years, but at the graduate level only. In order to meet these new requirements, we are adding two new courses to the mathematics curriculum: MHF 4403, The Early History of

Mathematics, and MAS 4214, Elementary Number Theory. MHF 4403 will study mathematical ideas from ancient times until the Renaissance. The student will explore the mathematical ideas of the various cultures studied and will be expected to do mathematics in the style of the period. MHF 5405, which had covered the History of Mathematics from ancient times until the present, will now be titled The History of Modern Mathematics and will concentrate on the Mathematics of the Western Culture. MAS 4214 will cover the fundamental ideas that constitute the discipline of Number Theory. Basic ideas of divisibility, prime numbers, and the algebra of congruence classes will constitute the major portion of the course. MAS 5215, the graduate course in the topic, will still be called Number Theory, but will emphasize more advanced techniques. Neither undergraduate course will be a pre-requisite for the corresponding graduate course.

The Curriculum and Evaluation Standards for School Mathematics, recently published by the National Council of Teachers of Mathematics, mandated changes in the curriculum and techniques of instruction of High School Geometry. Mathematics teachers at the secondary level need guidance in how to teach the revised course. The course content of MTG 4212, Geometry, will be revised to include discussions of Axiomatic Systems and Finite Geometries, various axiom systems for Euclidean and Non-Euclidean Geometries, and Analytic,

Transformational and Vector methods in Geometry. More hands-on activities which lead to cross links with other mathematical disciplines will be featured. The course will continue to be valuable for prospective teachers and for mathematics majors in general.

CHAIRMAN'S COMMENTS

Mathematics has become not only the language of science but the means to model and solve problems from social science, engineering, medicine, business, and a host of other disciplines. Resolution of these mathematical problems involve cognitive processes - such as interpretation, analysis, synthesis, evaluation, application, generalization, and deduction - skills that are requisite to solving everyday problems. Students with a good background in mathematics can readily apply these skills. In studying mathematically related problems they have learned procedures such as (1) examining what is known about the problem and carefully examining given conditions and definitions, (2) looking at special cases and alternatives, (3) examining advantages and implications of possible solutions, (4) formulating plans of pursuing solutions, and ultimately (5) finding a solution. They are thinking skills that good mathematics students have and that gives them an employment skill that employers are seeking. These are critical thinking skills that all students should to some extent develop.

The question for mathematics educators to consider is how the discipline of mathematics can effectively teach to general college students critical and creative thinking skills that are useful in mathematics and also outside of mathematics as well. In other words, how can mathematics be taught so that students learn to develop some thinking skills that are useful in solving everyday problems? The answer is to infuse critical thinking into mathematics instruction so that students become consciously aware of their thinking activity and aspects of critical thinking.

At the University, lower level mathematics courses for the non-mathematics major can be an excellent avenue in which to teach to general college students critical and creative thinking skills. Students in these courses are not there to prepare for subsequent courses in mathematics but to enrich their collegiate experience with further knowledge of mathematics. Part of this enrichment should include algebra, statistics, probability, logic, mathematics of finance, and decision theory. These topics are conducive not only for teaching computational skills but also "higher order" quantitative thinking skills useful in critical thinking such as (1) developing skill in generating new ideas by examining alternative possibilities, (2) clarifying ideas by analyzing, contrasting, and classifying ideas, and (3) assessing ideas by examining inferences and deductions.

Some faculty members at the University are studying ways to

REQUEST FOR ALUMNI INFORMATION

The Quaternion invites all alumni to provide us with information about your activities since leaving USF. We would like to pass this information on to our readers in the next issue. Please complete the following form and mail to:
Chairman, Dept. of Mathematics, USF, Tampa, FL 33620.

Name_____ Degree/Year_____

Mailing Address_____

City_____ State_____ Zip _____

Current Position_____

Firm or Institution_____

Personal News_____

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