South Texas Mathematics Consortium
12th Annual Meeting and Student Conference
21 February 2004
Texas A&M International University

Keynote Address:
Stephen Yau
University of Illinois at Chicago
Title: *Sharp estimate of number of integral points in n-dimensional tetrahedron.*
Abstract: The general problem of counting the number P_n of integral points in n-dimensional tetrahedron has been a challenging problem for almost a hundred years. For the case where the vertices are all integral points, an exact formula for this problem was found in 1994 by Capell and Shaneson. But this formula is too complicated and it is very difficult to get a sharp upper estimate from this formula. Motivated from number theory and singularity theory, we are interested in counting P_n for tetrahedron with real vertices (NOT integral vertices). This latter problem is much harder than the former one because the technique of toric variety from algebraic geometry is no longer applicable. In this talk we shall show how to get the sharp estimate of P_n for tetrahedron with real vertices.

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1. Joe McCarry
LCC
Title: *Back Off.*
Abstract: I will discuss back off algorithms for collision avoidance on Ethernet computer networks.

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2. Sandy Norman
Dept. of Science and Mathematics Studies, UTSA
Title: *Some Observations and Questions about a New Class of Plane Curves – The Pseudoconics.*
Abstract: I'll use Geometer's Sketchpad to examine an interesting and (I think) new class of plane curves that are analogs of the familiar conics. These curves however admit directrixes that need not be straight lines.

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3. Joseph Chance
UTPA
Title: *Problems From the Journals.*
Abstract: This talk focuses on novel solutions to two problems appearing in the problems sections of recent mathematical journals. Those seeking new problems for the classroom or subjects for term papers should attend.

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4. Dwight Goode
TAMUK
Title: *Implementing Challenging Mathematics Content in PreK-12*
Abstract: AIMS PreK-16 focuses on intensive professional development utilizing a standards-based mathematics program called TEXTEAMS. The presentation will describe the teacher observation instrument/process used, the teacher training, coaching, and follow-up provided, and how this facilitates student master of challenging mathematics content at all grade levels and ultimately success in advanced mathematics classes.

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5. Slavka Bodjanova
TAMUK
Title: *Changing fuzziness of fuzzy partitions.*
Abstract: Two methods of partial defuzzification of probabilistic fuzzy partitions will be proposed.

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6. Charles Bedard
TAMUK
Title: *"Proactive Ethics for Statisticians: Ruminations of a military statistician".*
Abstract: Designing an experiment and preparing its analysis to be able to meet the challenge of ethical questions should be a normal part of any experiment. Ethics however is more then just ensuring correct and responsible dealings with the customer and doing ethical research does not have to mean just taking whatever comes along regardless of what the customer is looking for. In some situations one can, in essence, have ones cake and eat it too. We will explore here some of the means of giving the customer what he wants while maintaining statistical and ethical integrity as well as the ethical and mathematical justifications therefore.

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7. David R. Cecil
TAMUK
Title: *Finding Inverses and Other Applications for a New Graphical Procedure.*
Abstract: A graphical development procedure will be presented that can be used to obtain function inverses. Applications include feedback methods and fixed point numerical approximation techniques.

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8. Morey, Jr., Philip S.
TAMUK
Title: *THE VANDERMONDE CONVOLUTION.*
Abstract: The Vandermonde Convolution is a well known binomial coefficient summation identity. A proof will be presented and some of the limitations of the identity will be discussed.

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9. Miguel Paredes
UTPA
Title: *College Math Faculty and Students and the School System.*
Abstract: Examples of three current programs will be described: Louis Stokes Alliance for Minority Participation, Math works in Texas conducted by South West Texas State and the nationwide initiative conducted by the Institute for Advanced Study of Princeton and the Park City Mathematics Institute. If time permits, the advantages and disadvantages of college Math faculty in the school system will be discussed.

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10. Ping "Charlene" Tintera
TAMUCC
Title: *The Impact Of Using Graphing Calculator On Math Self-Efficacy In College Algebra.*
Abstract: The use of graphing calculator is getting more common and more often in the high school and college level. Many researches have demonstrated that graphing calculator does benefit students' performance of skills. In the speaker's study, the use of graphing calculator was found to have a positive impact on students' confidence level on completing math tasks, completing courses, and problem solving.

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11. Hueytzen J. Wu, Texas A&M University-Kingsville, and Wan-Hong Wu, UT-Health Sciences Center at San Antonio
TAMUK
Title: *Various Processes of Compactifications on Normal Spaces.*
Abstract: Several processes of compactifications will be provided on Normal space and prove the known fact that Stone-Cech and Wallman compactifications on Normal space are homeomorphic.

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12. Alex Sadovski
TAMUCC
Title: *"Supplemental data Acquisition Tools for Modeling Environmental Systems"* by Carl Steidley, Rafic Bachnack, Alex Sadovski
Texas A&M University-Corpus Christi
Abstract: In this paper we describe our primary data acquisition system for our environmental systems modeling efforts. Additionally we present design issues, development issues, and test results encountered in the production of two supplemental data acquisition systems. Finally, we present examples of the use of some of the acquired data for several of our water level prediction modeling efforts at Texas A&M University Corpus Christi.

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13. Margolin Lia
Katharine Gibbs College
Title: *Solution Of Kinematic Rotation And Symmetrization Problems For the Various Types of Few-Body Systems.*
Abstract: Developed Hyperspherical Function Method(HFM)in impulse representation. Derived the complete set of recurrence relations for obtaining kinematic rotation coefficients under particle permutations with any hypermomentum and total orbital momentum. Developed construction scheme of symmetrization for the basic hyperspherical functions.

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14. Lee N. Von Kuster
UTPA
Title: *Reflections From a Life Time of Teaching Mathematics*
Abstract: My teaching career started in February 1955. My presentation will review my thoughts abut what has happened in the mathematics movements from then until now and some personal experiences as well as personal opinions of where we have been, where we are now, and where we may be going.

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15. Rohitha Goonatilake
TAMIU
Title: *A Glimpse of Probabilistic Cryptography*
Abstract: A great deal of discussions on computer vulnerability is currently taking place. New tools, innovative methods, and inventions are discovered to prevent computers that are increasingly becoming vulnerable, to remedy the situation, and also to take actions against the associated risk. In this paper, attempts will be made to assess the computer vulnerability under various predetermined conditions in order to determine the extent of the situation and to ascertain the possible losses. This presentation expands on the idea of probabilistic cryptography to understand the motivation behind the topic.

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16. Antonio G. Carranza
TAMIU
Title: *Expectation, Moments and Conditional Expectation*
Abstract: Conditional probability is a very useful tool in modeling many real-wold phenomena; closely allied with conditional probability is the idea of conditional expectation; average taken with respect to a conditional probability law, conditional expectation and some of its applications will be presented in this talk.

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17. Melissa Medina-Razzaque
TAMIU
Title: *Transformations and Limit Theorems: Order Statistics*
Abstract: Probability law for the difference between the largest and smallest of the random variable, or probability distribution for the ranked value have a special place in the study of random variables. These questions can be investigated through the order statistics of random variables. The is the topic of the talk.

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18. Cynthia Sanchez
TAMIU
Title: *Transformations and Limit Theorems: Functions of Random Variable*
Abstract: Some results useful in deriving the probability law of a function of a single random variable, and some applications of those ideas need to be examined. There are also many applied problems requiring the probability distribution of a single function of n jointly distributed random variables. A number of techniques are useful in deriving such distributions, several of which will be discussed in the talk.

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19. Patricia D. Valdez
TAMIU
Title: *Transformations and Limit Theorems: Limit Theorems*
Abstract: Some preliminary version of limit theorems and related problems regarding convergence in probability, convergence in distribution, and convergence in mean will be presented in this talk.

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20. Jackie Lynn Herrera and Gloria Z. Trevino
TAMIU
Title: Magic Tricks
Abstract: TBA

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21. Gerardo Limon and Judith Limon
TAMIU
Title: *Topology, A Brief Look*
Abstract: In this paper we will be defining Topology, what it is and what it stands for. We will discuss general topology and topological spaces. We will demonstrate two topological activities that can be enjoyed.

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22. Dmitry Gokhman
UTSA
Title: *Applications of the wavelet transform to differential equations.*
Abstract: In the last 30 years the wavelet transform has become the tool of choice for many applications in sciences and engineering, geophysics. I'll give an introduction to wavelets and show you a new application to differential equations, which is joint work with Alfonso Castro and Jaime Navarro.

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23. Liliana P. Castillo
Title: *Growth and Decay Applied to Common Life*
Abstract: The application of growth and decay functions in chemistry and physics in order to solve problems of bacterial colonies and temperature change.

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24. Roger Knobel
UTPA
Title: *The Anti-eigenvalues of a Matrix*
Abstract: With its roots in functional analysis and operator theory, the anti-eigenvalues of a matrix are a measure of rotation angles, much like eigenvalues are a measure of dilation. In this talk, an overview of anti-eigenvalues and anti-eigenvectors for matrices will be given, including the geometric and analytic computation of anti-eigenvalues for special classes of matrices.

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25. Carlos A. Velazquez and Oscar Raga
TAMIU
Title: TBA
Abstract: TBA

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26. Felipe Soto and Hector M. Cantu
TAMIU
Title: TBA
Abstract: TBA

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27. Fengxin Chen
UTSA
Title: *Traveling Waves for Nonlocal Evolution Equations*
Abstract: The main concern of this talk is the existence, uniqueness and stability of the traveling waves for a class of nonlocal evolution equations, which include the classical reaction-diffusion equation, Ising model, neural network, nonlocal Allen-Cahn Equation, and thalamic model. The spectrum of linearized operator about a traveling wave for the nonlocal evolution equations is estimated.

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28. Pablo Tarazaga
TAMUCC
Title: *Euclidean Distance Matrices and Elementary Geometry*
Abstract: Euclidean Distance matrices form a non-polyhedral cone and the faces structure is related to the geometry of the configuration of points. For four points configurations we will look to the face of the square and identify the structure algebraically. Also we will look to the information provided by system of coordinates.
