Abstracts of Talks
for the 2008 KYMAA Annual Meeting

Western Kentucky University, Bowling Green

March 28 - 29, 2008

Note: Undergraduate student speakers are indicated by (u), graduate student speakers are indicated by (g), and faculty speakers are indicated by (f).

Contributed Talks:

Robert Amundson, Murray State University (u)
The Lie Group $GL(n,Q)$ and Lie Algebra $gl(n,Q)$
The Lie algebra $gl(n,Q)$ is something that has not been investigated before. This presentation will give a general overview of the Lie group $GL(n,Q)$ and the Lie algebra $gl(n,Q)$ and the motivation for finding the Lie group and Lie Algebra.

David Benko, Western Kentucky University (f)
The Pros and Cons of Ebay
We will present the best buying and selling strategies on Ebay - from a mathematical point of view. We will also propose a better way to rate sellers on Ebay. Disclaimer: I do not own shares of Ebay...

Timothy M. Brauch, University of Louisville (g)
Counting Perfect Matchings
This presentation will show an application of combinatorial nullstellensatz for detecting perfect matchings in bipartite graphs. An elegant circular lock idea will be explored to show some beautiful relationships of graph theory with other branches of mathematics. Some known results as well as open problems will be presented. This is joint work with André E. Kézdy (University of Louisville) and Hunter S. Snevily (University of Idaho). Knowledge of one semester of undergraduate linear algebra will be assumed.

Woody Burchett, Georgetown College (u)
Thinking Inside the Box: Geometric Interpretations of Quadratic Problems in BM 13901
In my talk I will examine some quadratic problems from the Babylonian Mathematical tablet BM 13901. I will compare some interpretations of my own with those of Mathematician Jens Hoyrup and explain how the Babylonians used geometry to solve problems, which in modern times, are solved primarily with algebra.

Jonathan Butcher, Joe Chambers and Nathan Potratz, Asbury College (u)
Simply Sudoku
This presentation, based on research done for the 2008 COMAP MCM contest, illustrates our algorithm designed to create random Sudoku puzzles of varying difficulties. Our unique approach guarantees a unique solution and the correct difficulty every time.

Doug Chatham, Morehead State University (f)
Symmetries of Solutions to the N+k Queens Problem
The classic N-Queens Problem asks for an arrangement of N queens on an N-by-N chessboard such that no two queens attack each other. It is easy to see that reflecting an N-Queens solution vertically, horizontally, or diagonally always produces a distinct solution. We consider reflections of solutions to the N+k Queens Problem, which asks for an arrangement of N+k queens and k pawns on an N-by-N chessboard where no two queens attack each other. We show that no solution to the N+k Queens Problem is symmetric with respect to a vertical or horizontal axis. Finally we discuss rotational symmetries.

Kelly Christensen, Ted Landis, and Joe Thacker, Asbury College (u)
Good Health is Hard to Find
This presentation is based on the COMAP ICM 2008 competition and will show a way to quantify a country's health care system. Results are achieved using multiple regression and three metrics from each of the following health categories: economic, personal health, and infrastructure.

Benjamin Clapp, Kayla Menkedick, and Alasdair Wooffitt, Asbury College (u)
International Healthcare Efficiency
One of the first, and most important, responsibilities of any society is the provision of healthcare for its residents. The relative value of healthcare, however, is not within the purview of mathematics to study. Mathematics can, however, show us how well we are using the dollars that we do put into healthcare, and how we can use those dollars more efficiently. This presentation will show how this team solved COMAP's ICM 2008 problem. **WITHDRAWN**

Taylor J. Clements, Murray State University (u)
Boundaries of Complex Polynomials and Their Roots
There have been numerous publications on various methods of placing bounds on the zeros of a polynomial. We will compare and contrast these various methods with the use of the computer algebra system Maple. This is a continuation of work at Murray State University started by Scott Holbrook and Ryan Walls.

John M. Cochran, University of Louisville (g)
Data Tracking Using Mathematical Imaging
The mathematical imaging literature continues to expand with many different applications including image segmentation, motion tracking, medical image analysis, and image classification. Many models have been developed to handle these applications including the Mumford-Shah functional, active contours without gradient, and the geodesic model. This presentation will touch on the methods of the active contours without gradient model developed by Tony Chan and Luminitia Vese and suggest modifications which allow for the segmentation of a fixed region of data. The idea is to detect regions in data which are of some interest such as regions of high temperature or concentration. Two examples are given - the two-dimensional transport equation and the two-dimensional heat equation.

David DeSario, Georgetown College (f)
Generalized Solid Angle Theory for Real Polytopes
The natural generalization of a two-dimensional angle to higher dimensions is called a solid angle. We extend many theorems from the theory of solid angles of polyhedra, which hold true for rational polytopes, to results for real polytopes that involve more general solid angles. A rational polytope is a polytope whose vertices all have rational coordinates, whereas a real polytope has vertices with arbitrary real coordinates.

Scott Dillery, Lindsey Wilson College (f)
Moving Away from Developmental Algebra Courses
Attrition and retention in developmental algebra courses is a problem at all schools which include them in the curriculum. An alternative is to offer curriculum that is not remedial in nature at a level appropriate. An example of a course which incorporates data, modeling and spreadsheets is discussed.

Wandi Ding, Middle Tennessee State University (f)
Optimal Control on a Hybrid Tick Disease Model
We are considering an optimal control problem for a type of hybrid system involving ordinary differential equations and a discrete time feature. One state variable has dynamics in only one season of the year and has a jump condition to obtain the initial condition for that corresponding season in the next year. The other state variable has continuous dynamics. Given a general objective functional, existence, necessary conditions and uniqueness for an optimal control are established. We apply our approach to a tick-transmitted disease model with age structure in which the tick dynamics changes seasonally while hosts have continuous dynamics. The goal is to maximize disease-free ticks and minimize infected ticks through an optimal control strategy of treatment with acaricide. Numerical examples are given to illustrate the results.

Rob Donnelly, Murray State University (f)

The Numbers Game and Dynkin Diagram Classification Results

The numbers game is a one-player game played on a finite simple graph with certain integer weights assigned to its edges. Graphs possessing a certain finiteness property with respect to this game are shown to correspond precisely to the Dynkin diagrams for the finite-dimensional complex semisimple Lie algebras. One proof uses a topological characterization of the set of starting positions for convergent numbers games. Those matrices for which there exist finite posets with certain structural properies are consequently shown to be the Cartan matrices associated to these semisimple Lie algebras. As a further application, a combinatorial characterization of nice distributive lattice models of the Weyl characters for the irreducible representations of the rank two semisimple Lie algebras is given. Further related problems are discussed.

Marcia Edson, Murray State University (f)

On the Number of Partitions of an Integer in the m-Bonacci Base

For each $m \geq 2$, the m-bonacci numbers are defined by $F_k = 2^k$ for $0 \leq k \leq m - 1$ and $F_k = F_{k-1} + F_{k-2} + \cdots + F_{k-m}$ for $k \geq m$. When $m = 2$, these are the usual Fibonacci numbers. Every positive integer n may be expressed as a sum of distinct m-Bonacci numbers in one or more different ways. For example, when $m = 2$, $50 = 34 + 13 + 3 = F_7 + F_5 + F_2$ which gives rise to a representation of 50 as 10100100. Let $R_m(n)$ be the number of partitions of n as a sum of distinct m-bonacci numbers. In this presentation, a formula for $R_m(n)$ involving sums of binomial coefficients modulo 2 is given. The proof of this formula makes use of a theorem of Fine and Wilf.

Philip Fackler, Christopher Hatfield, and Aaron Iddings, Asbury College (u)

Can Santa Swim? Modeling the Effects of the Melting North Polar Ice Cap on the Coast of Florida.

Global warming is a constantly-growing threat to our environment worldwide. It has the potential to affect millions of people living along coastal lands around the world. This problem has come to the forefront of our attention in recent years, since the rate of the effects of global warming (such as the melting North Polar Ice Cap) has increased dramatically. In this year's COMAP modeling competition, one problem asks us to model the effects the melting North Polar Ice Cap will have on Florida. In light of this ever-intensifying situation, we have developed a simple, but realistic, model to show this.

Bill Fenton, Bellarmine University (f)

Radical Axes of Apollonian Circles on a Triangle

Given three ratios, the vertices of a triangle induce three Apollonian circles on the triangle. Each pair of these circles has a radical axis. The three radical axes are concurrent at a familiar point. Furthermore, there is a simple criterion for coincidence of the radical axes.

Matthew R. Gilliland, Murray State University (g)
Distributive Lattices Structured by the F_4 Dynkin Diagram
A distributive lattice is a partially ordered set with certain nice properties. Combinatorial methods for investigating distributive lattices which have a certain structure related to the Weyl group F_4 are discussed. The focus of this presentation is on the two newly discovered F_4-distributive lattices with 324 and 1053 elements and some lattices for F_4 that were previously known.

Gary Goodaker, West Kentucky Community and Technical College (f)
Using Kentucky Governor's Cup Mathematics Written Assessments in Elementary Teachers Courses
Instructors of Math for Elementary Teachers Courses can use the elementary level math written assessments from Kentucky's Governor's Cup Academic Competition to reinforce key topics in a fun and exciting way. This session will describe these assessments, how they relate to the objectives of these courses, and how they can effectively be used with the students.

Sara Haque, Centre College (u)
The Completeness Tale of the Incompleteness Theorem
The goal of proving the consistency of arithmetic was first proposed by David Hilbert in 1900 at the International Congress of Mathematicians in Paris, along with other problems which came to be known as Hilbert's 23 problems. In 1931 Kurt Gödel found a solution and surprised everyone by showing arithmetic cannot be proven consistent in what has become known as Gödel's Incompleteness Theorem. This presentation follows the life and work of David Hilbert with particular attention to the Incompleteness Theorems. The solution as presented by Kurt Gödel will be discussed.

Jeffrey Heath, Centre College (f)
Modeling Baseball Using Markov Chains
We discuss a Markov chain model of baseball. In the model, a state is assigned in an inning based on the number of outs and runners on base. Finding the transition probabilities between the states allows us to place a value on each of these states. We can then make mathematically-sound decisions for baseball strategies including bunting and stealing bases.

Lisa Holden, Northern Kentucky University (f)
Protostar Formation: Describing the Collapse of a Molecular Cloud Core
We consider the gravitational collapse that occurs in molecular cloud cores just prior to star formation. Previous studies have focused on calculating the mass infall rate for spherically-shaped cores. We seek to extend this body of literature by considering the gravitational collapse of cylindrically-shaped cores. The gravitational collapse is described by a set of partial differential equations for self-gravitating fluids. Initial conditions are obtained through an asymptotic analysis of the system and the equations are then solved using numerical techniques. We will present the results of our analysis and compare our results to those obtained previously for spherically-shaped cores. This is joint work done with Kevin Hoppins, a NKU student.

Jesse Johnson, Centre College (u)
Cyclotomic Cosets and Finite Fields
For any prime p and any integer $n > 1$, the cyclotomic coset $[s]$ generated by s mod p^n-1 is the set $\{s, ps, p^2s,\ldots\}$ where each integer is reduced mod p^n-1 In this talk we will look at some of the properties of these sets and how they are connected to the study of finite fields.

Courtney Kepple, Western Kentucky University (u)
Interesting Properties of Parabolas
Parabolas have many interesting properties. For example, if $p(x)$ is a parabola and $l(a,x)$ is a line connecting two points $(a, p(a))$ and $(a+h, p(a+h))$ on the parabola horizontally separated by h units, then the area between $p(x)$ and $l(a,x)$ is independent of the position a and dependent only on the horizontal distance h. We show that this property characterizes parabolas.

Bruce Kessler, Western Kentucky University (f)
Mathematical Myth-busting: The "Boiling Water" Myth
My grandmother always contended that cold water would boil faster than warm water. Wanting to believe my "granny," I accepted this as fact for many years. Then I learned of Newton's Law of Cooling, known to most calculus or physics students, which states that the rate of change in temperature of a substance is proportional to the difference in temperature of the substance and the surrounding medium, and I believed it even more. After all, cooler water means a greater difference in temperature between the water and the burner, thus a faster increase in temperature. But is it really true? Are there really two temperatures T_1 and T_2, with $T_1 < T_2$, such that, under identical conditions, water at temperature T_1 will come to a boil faster than water at temperature T_2? We will confirm or bust this "myth" using mathematics.

Joshua Knox, Morehead State University (u)
Random Graphs for Modeling Online Social Networks
We consider a new model of constructing random graphs that generalizes methods proposed by Barabási and Albert. We provide theoretical and experimental analyses of various parameters in the resulting graphs. This talk represents joint work with Patrick Bahls, Samuel R. Kaplan, and R. Duane Skaggs.

Duk Lee, Asbury College (f)
Why Can an Angle Trisection Be Done By Origami?
There is a well-known paper-folding procedure for an angle-trisection. This presentation will give a precise mathematical account for each step of the origami trisection maneuver. All we need to know is little bit about Parabolas, Trigonometry, and Calculus.

Andrew Long, Northern Kentucky University (f)
A Computer-Controlled Function Box for Plotting Surfaces
By “function box” we mean a machine for producing three-dimensional surfaces corresponding to functions of two-variables. Two students built our function box: one built the machine, and the other made it work. The result is a 27x27 collection of pins, driven by stepper motors, with MATLAB code controlling the operation. With it, the user can produce a surface in about 10 minutes, just exactly the right amount of time for a talk at a math meeting.

Andrew Long, Northern Kentucky University (f)
Optimal Placement of Fixed Solar Panels
Last year I was on sabbatical in Ranquitte, Haiti, where solar panels provided all our power. I found the panels poorly placed – placed by convenience, rather than to optimize power. I’ll illustrate how a little linear algebra and calculus can go a long way.

Stacy Long, Georgetown College (u)
Cosmology and Einstein's General Relativity
On a large scale, the universe is essentially uniform and gravity is the only force that matters. Using Einstein's stress-energy tensor, the Robertson-Walker metric, and the Friedman equation, a formula comes out for the measurement of the change of the size of the universe with time. Under certain physically relevant conditions, like the universe being spatially flat or Einstein's cosmological constant being set equal to zero, the integrals are doable. I conclude with an evaluation of the parameters according to data from supernovae and Cepheid variables.

Andy Martin, Kentucky State University (f)
*OoOps! Are We Forgetting to Update the **O**rder **o**f **Op**erations?*
“My Dear Aunt Sally” pays a visit to most beginning (remedial) college algebra courses, and usually we “Please Excuse” her. But the OoOps she brings is incomplete (how is -5^2 to be interpreted, according to the OoOps?) The OoOps is often misrepresented as presenting the order in which operations *must* be performed, but we will prove that is not so, and offer an explanation of what it truly is. The OoOps is conspicuously absent from Precalculus and Calculus texts. What about new cases that appear there? Does log 3x mean log(3) · x or log(3·x) ? How about cos x + 5?

Rus May, Morehead State University (f)
An Expectation in the Birthday Problem
The birthday problem involves questions about the probability that among a group of people at least two of them have the same birthday. We investigate the expected number of people needed to obtain a duplicate birthday and show how generating functions reduce this problem to child's play. Also, we apply asymptotic analysis to get a nice approximation of this expectation.

David K. Neal, Western Kentucky University (f)
Limits of Mean and Variance of a Fibonacci Distribution
A probability distribution is defined on the set $\{1, \ldots, n\}$ with decreasing masses determined by the Fibonacci sequence $F_n, \ldots, F_1$. The mean and variance are computed and it is shown that the limit of these parameters, as n increases to infinity, are simple functions of the Golden Ratio Φ.

Lan Nguyen, Western Kentucky University (f)
Something about the Fixed Point Theorem
Who does not know about the fixed point theorem? What can we still say about it? In this presentation, we will give different types of fixed point theorems and their applications.

Kenny Palmer, Western Kentucky University (f)
Trigonometry of Music
Because sound moves in waves, many aspects of music can be described by trigonometry. This presentation will explore the trigonometric relationships of musical intervals, chords, harmonies, and dissonance using *Mathematica* and will employ mathematics from simple concepts of period and phase to solutions to the wave equation.

Bettina Richmond, Western Kentucky University (f)
A Total Quasiorder on Finite Topological Spaces
In a finite topological space X and $a \in X$, let M_a denote the minimal open set containing a. The topology on X has basis $\{M_a : a \in X\}$. Using the M_a's, we can associate with each $a \in X$ a sequence $q(a) \in \prod_{i \in \mathbf{N}} \mathbf{N}_0$ which consequently gives a total quasiorder on X. This allows for systematically constructing all topologies of small order.

Mark Robinson, Western Kentucky University (f)
Iterative Methods for Linear and Nonlinear Systems
Iterative techniques for the solution of linear and nonlinear systems of equations are considered. This presentation includes discussion of the Jacobi and Gauss-Seidel iterative methods for solving linear systems, as well as fixed-point iteration for the solution of nonlinear systems. Numerical examples are included.

Dirk Schlingmann, Eastern Kentucky University (f)
The Mathematics of Music
The Mathematics of Music was the title of a one-day hands-on workshop for talented high school graduates who participated in Eastern Kentucky University's first week-long Mathematics and Science Academy in summer 2007. The presenter will talk about his experience conducting this workshop. After an introduction to online mathematics and science resources, we introduced the students to technical computing with *Mathematica*. We covered the numerical, symbolical, and graphical features of *Mathematica*; and we showed them how to write their own functions and programs. Then we discussed the physics of sound (tuning forks, waves, frequencies, amplitudes, harmonics/overtones, interference of waves). Next, we reviewed trigonometric functions and their periodic behavior. We discovered that periodic functions of frequency, *freq*, can be approximated by Fourier Series, a sum of a constant and multiples of Sin and Cos functions of frequencies *freq*, 2 *freq*, 3 *freq*, etc.; we even learned how to fit a periodic function through sample data. At the end, we recorded sounds and assigned projects on how to manipulate the recorded sounds, how to play it backwards, or how to change the speed of a melody. Students had to analyze the physical behavior of a recorded sound concerning frequencies and overtones/harmonics.

Mandy Smith, Centre College (u)
Persistence Barcodes for Digits
This research is focused on developing a faster algorithm for computer recognition of objects represented by point clouds. We begin by expanding the image to the third dimension by adding a tangent angle coordinate. We then look at the Betti numbers, which represent the number of segments and the number of holes, for each expanded object. Each point is assigned a time at which it enters the picture based on its curvature, and as the character grows, we examine the evolution of the Betti numbers. We then calculate a "barcode" to document the lifespan of each component. By comparing barcodes, a distance matrix can be created to sort the digits. We conduct tests using real handwriting samples from the MNIST database. The goal is to create a learning algorithm for the computer.

John Spraker, Western Kentucky University (f)
A Talk of Acceptable Duration
This talk will cover the basics of bonds, duration, and convexity. These topics form a fairly simple application of concepts from calculus and elementary probability theory. In particular the Macaulay duration will be defined and its relation to bond prices and yields will be introduced.

Rachel Stamper, Centre College (u)
Cantor's Contributions to the Study of Infinite Sets
Georg Cantor was the first mathematician to regard infinity as a completed entity, which allowed him to compare the relative sizes of sets. This presentation will discuss the history of humanity's study of infinity and Cantor's contributions to our understanding of the infinite, including the controversy surrounding the publication of his work and details about the Continuum Hypothesis.

Ryan Walls, Murray State University (u)
An N-gon Knot Invariant
The central question of knot theory is, "When do two diagrams represent the same knot?" This presentation will seek to find a knot invariant through n-gons with n being the crossing number of the knot.

D. Jacob Wildstrom, University of Louisville (f)
Relocation Problems for Limited-Mobility Service Providers
The location of facilities in response to demand has often been viewed as a static problem of optimal situation with respect to a fixed client list; dynamic facility location explores the possibility of a changing client list over time and the ability of the server to relocate in response to changing demand. This presentation explores several variations on dynamic facility location, particularly with regard to asymmetric or mobility-restricting cost structures.

Omer Yayenie, Murray State University (f)
A New Generalization of the Fibonacci Sequence and an Extended Binet's Formula
Consider the Fibonacci sequence $\{F_n\}$ having initial conditions $F_0 = 0$, $F_1 = 1$ and recurrence relation $F_n = F_{n-1}+F_{n-2}$ $(n \geq 2)$. The Fibonacci sequence has been generalized in many ways, some by preserving the initial conditions, and others by preserving the recurrence relation. In this article, we study a new generalization $\{q_n\}$, with initial conditions $q_0 = 0$ and $q_1 = 1$ and generated by the recurrence relation $q_\mathrm{n} = aq_{n-1} + q_{n-2}$ (when n is even) or $q_n = bq_{n-1} + q_{n-2}$ (when n is odd), where a and b are nonzero real numbers. Some well-known sequences are special cases of this generalization. The Fibonacci sequence is a special case of $\{q_n\}$ with $a = b = 1$. Pell's sequence is $\{q_n\}$ with $a = b = 2$ and the k-Fibonacci sequence is $\{q_n\}$ with $a = b = k$. We produce an extended Binet's formula for the sequence $\{q_n\}$ and, thereby, identities such as Cassini's, Catalan's, d'Ocagne's, etc.

Invited Speakers:

The Truth of Proofs, David Bressoud, Macalester College.

Abstract: Mathematicians often delude themselves into thinking that we create proofs in order to establish truth. In fact, that which is "proven" is often not true, and mathematical results are often known with certainty to be true long before a proof is found. I will use some illustrations from the history of mathematics to make this point and to show that proof is more about making connections than establishing truth.

Bio: David Bressoud is DeWitt Wallace Professor of Mathematics at Macalester College and President-Elect of the MAA. He has received the MAA Distinguished Teaching Award (Allegheny Mountain Section), the MAA Beckenbach Book Award for Proofs and Confirmations, and has been a Polya Lecturer for the MAA. He has published over fifty research articles in number theory, combinatorics, and special functions. His other books include *Factorization and Primality Testing*, *Second Year Calculus from Celestial Mechanics to Special Relativity*, *A Radical Approach to Real Analysis* (now in 2nd edition), and, with Stan Wagon, *A Course in Computational Number Theory*. His latest book, *A Radical Approach to Lebesgue's Theory of Integration*, has just been published by the MAA.

The Evolution of the Cryptologic Bombe, Chris Christensen, Northern Kentucky University

Abstract: Early successes by the German military in the blitzkrieg attack in Europe and the Battle of the Atlantic were in part due to the ability of the German military to quickly transmit secure tactical messages. One of the machines used to secure German messages was Enigma. Part of the Allied defeat of Germany can be attributed to the Allies' breaking of Enigma. One of the devices used to break Enigma was called the bombe. We will consider an initial version of the bombe that was constructed by the Polish mathematician Marian Rejewski during the 1930s, a second generation bombe that was developed by the British mathematician Alan Turing and improved by the algebraic geometer Gordon Welchman, and the US Navy's cryptologic bombe that was built by Joseph Desch, an engineer at National Cash Register in Dayton, Ohio.

Bio: Chris Christensen is in his twenty-fifth year of teaching mathematics at Northern Kentucky University. His mathematical genealogy is a sequence of algebraic geometers. More than a decade ago, he read Robert Harris' *Enigma* and thought "that's interesting" and "it's fifty years later, a lot of mathematics has been developed in the meantime, this would probably be easy today." It's not. Today, he still finds cryptology interesting, and he has developed a great deal of respect for the mathematicians (and other codebreakers) at Bletchley Park and for the cryptographers and cryptanalysts who preceded them and followed them.

Mathematics as a Mechanism for Cohesion in Biology, Louis J. Gross,Departments of Ecology and Evolutionary Biology and Mathematics, University of Tennessee, Knoxville

Abstract: Biology is a tremendously diverse field covering systems operating at vastly different scales, with differing levels of interaction between these. Perhaps one of the greatest challenges in biology is that of representativeness: how representative are observations and methods we develop for one biological system applicable to other systems, at different locations, in different organisms, or at different levels of organization in the hierarchy of biology? This inherently theoretical question underpins much of the past effort in mathematical biology, driven typically by the desire to develop the general principles by which biological systems are organized and operate. Yet at the same time there are demands for answers to quite specific questions to better manage natural systems, to enhance human health, and to plan for the future impacts of human actions. Some argue that we have not been tremendously successful to date in moving from theory to practice. I will give a variety of examples of projects in mathematical ecology that lie at this interface between theory and practice, providing some indication of the utility of quantitative methods to elucidate general patterns of natural systems and how these have proven useful in application. I'll conclude this positivist view of mathematical biology with some suggestions as to how we might best develop collaborative endeavors to build a more cohesive theory in biology.

Bio: Louis J. Gross is Professor of Ecology and Evolutionary Biology and Mathematics and Director of The Institute for Environmental Modeling at The University of Tennessee, Knoxville. He completed a B.S. degree in Mathematics at Drexel University and a Ph.D. in Applied Mathematics at Cornell University, and has been a faculty member at UTK since 1979.

He has led the effort at UT to develop an across trophic level modeling framework to assess the biotic impacts of alternative water planning for the Everglades of Florida. He has co-directed several courses and workshops in Mathematical Ecology at the International Center for Theoretical Physics in Trieste, Italy, has edited or co-edited four books, served as Chair of the Theoretical Ecology Section of the Ecological Society of America, as President of the Society for Mathematical Biology and as Chair of the National Research Council Committee on Education in Biocomplexity Research. He is the 2006 Distinguished Scientist awardee of the American Institute of Biological Sciences.

Presentations and Panel Discussions:

The Gatton Academy of Mathematics and Sciences in Kentucky

The first classes of Kentucky's Academy of Mathematics and Sciences began in August, 2007. Located on the campus of Western Kentucky University, the residential Academy provides a challenging curriculum for 60 high school juniors and 60 seniors. The Academy will be known as the Carol Martin Gatton Academy of Mathematics and Sciences in Kentucky, thanks to a generous donation of $4 million from Bristol, TN businessman C. M. "Bill" Gatton. Panelists will provide information and answers about the Academy.

Moderator: Mark Robinson

Panelists:
Barry Brunson, Mathematics Professor
Claus Ernst, Mathematics Professor
Sam Fedorka, Academy Student
Julia Freeman, Academy Student
Tim Gott, Academy Director

Statewide Mathematics Placement Testing Project

The Statewide Mathematics Placement Testing Project provides secure, online placement tests in developmental mathematics, college algebra and calculus that can be used free of charge by any educational institution in the state. An overview of the project, a demonstration of the online testing process, and directions on how to gain free access to the system will be given.

Presenters:
Paul Eakin, University of Kentucky
Steve Newman, Northern Kentucky University

Perspectives on Transition Courses

Many institutions offer transition or bridge courses with the goal of enabling the success of students as they progress from more computationally-oriented mathematics courses to more theoretical mathematics courses. Bressoud, McAllister, and Richmond have written textbooks in support of such courses and will present the particular philosophies, insights, motivations, and hopes that inspired the writing of these books. Faulkner will share her experiences taking a transition course, and the experience of fellow students who elected not to take such a course. After ten minute presentations by each panelists, discussion will ensue based on questions from the attendees.

Panelists:
David Bressoud, Macalester College
Leanne Faulkner, Kentucky Wesleyan College
Alex McAllister, Centre College
Tom Richmond, Western Kentucky University