Abstracts for Contributed Papers: 2010 Section Meeting

(Note: due to scheduling constraints, some talks may be moved to other sessions)

Session: Undergraduate

Speaker: Xander Rudelis, University of Central Oklahoma
Title: Knot Theory and Braid Computation
Abstract: Knot Theory, a field of topology, concerns itself with the mathematical nature and properties of knotted embeddings of closed loops in space. A projection of a knot is a diagram that illustrates its crossings, and the same knot may have different projections which can be related by a set of Reidemeister moves. A central challenge in knot theory is to discover an invariant that will tell us without doubt if two projections represent the same knot; many incomplete invariants exist. Braid theory is closely related to knot theory; in fact, any knot can be represented as a closed braid. The unambiguous nature of a braid makes it useful for the computation of knot properties using algorithms. We have constructed a module for the Python programming language to begin to tackle this challenge. The module can be used to construct many braids that may be manipulated without altering the knot, or to calculate invariants to help distinguish knots.

Speaker: Timothy Schilttenhardt, University of Central Oklahoma
Title: An Application of the Finite Difference Approximation to Malaria Infection
Abstract: A derivation of the finite difference numerical approximation for a system of two partial differential equations and four ordinary differential equations that models red blood cell production in a person infected with malaria will be presented, along with some examples of the solutions it generates for interesting initial conditions.

Speaker: Devin C. Smith, University of Central Oklahoma
Title: The Effect of the Nazi Regime on the World of Mathematics and Individual Mathematicians
Abstract: During the 1920's and 30's the University of Gottingen in Germany was considered to be the center of mathematics, with a long line of famous mathematicians from Gauss to Klein. As the Nazis gained power, many Jewish mathematicians were forced to leave the University and flee from their own country. In this talk we will explore some of the personal experiences of these mathematicians. Of course not all mathematicians in Germany were Jewish. We will also discuss mathematicians of "true" German descent who remained in their teaching positions, some of whom even persecuted fellow mathematicians of Jewish descent. We will conclude by looking at the effect these emigrating mathematicians had on American mathematics, as well as how German mathematics was affected by losing so many great mathematicians.

Speaker: Jingshu Zhao, Cameron University
Title: Enclosing roots of polynomial equations and their applications to iterative processes
Abstract: We introduce a special class of real recurrent polynomials f_m, $(m \geq 1)$, of degree *m*, with unique positive roots s_m, which are decreasing as *m* increases. The first root s_1, as well as the last one, denoted by s_∞, are expressed in closed form, and enclose all s_m, $(m > 1)$. This technique is also used to find sufficient convergence conditions for some popular iterative processes converging to solution of equations that are weaker than have been known.

Speaker: Kandi J Archer, Southwestern Oklahoma State University
Title: Rocket Explosion Risk Analysis
Abstract: We analyze the area at risk in the event of a catastrophic launch failure, that is, a rocket explosion. Starting from the simplest physical assumptions, we proceed to more realistic models of greater complexity. Numerical and graphical simulation will be provided throughout in order to help with visualization.

Speaker: Taylor Israel, Oklahoma Wesleyan University
Title: "Romeo, Romeo, What Are Thou Differential Equations?"
Abstract: Following the ideas of Steven Strogatz in "*Love Affairs and Differential Equations*", we attempt to model the dynamics of romantic relationships with differential equations. We investigate our two functions "Romeo" and "Juliet", determining solutions with both exact techniques and RK approximations, in order to predict the evolution and outcome of their relationship based upon the romance style of each partner. We also look at variations in Strogatz's model by introducing a time-dependent component into the equations, as well as make brief comparisons with a real-life collegiate survey.

Speaker: Katie Weaver, University of Arkansas – Fort Smith
Title: Connectiveness of Graphs
Abstract: The focus of this paper is to determine the connectiveness of any connected graph. The *connectiveness* of a connected graph is the number of vertices that can be removed, along with adjacent edges, without disconnecting the graph. We would like to determine the connectiveness of a graph based on particular properties of the graph instead of checking each vertex individually. Specific classes and types of graphs are considered first, and then the connectiveness of generalizations of these graphs is explored. Specifically, we consider how the connectiveness of two graphs affects the connectiveness of a graph constructed by joining the graphs in different ways, the Cartesian product of the graphs, and the tensor product of the graphs.

Speaker: Eric Bickerton, University of Arkansas – Fort Smith
Title: Lie Algebraic Properties of Vertex Algebras
Abstract: Vertex algebras arose from studies performed by string theorists, conformal field theorists and quantum field theorists in an attempt to describe the basic interactions of quantum particles. It is a complex mathematical object and not many properties are known about it. Lie algebras are mathematical objects whose properties are very well known. The goal of the research project is to discover new Lie algebraic properties of vertex algebras so that we can better understand the physics of quantum particles. In this talk, we discuss some Lie algebraic properties of vertex algebras that we have found. Specifically, we found Lie algebras in V_1 and V_2, which are subsets of a vertex algebra *V*.

Speaker: Johnny Stitts, Arkansas State University
Title: Residues and Improper Integrals of Some Functions
Abstract: We use Cauchy's residue theorem to find improper integral of a function that has n singular points in the complex plane (n is a positive integer greater than 1). We choose a special path that only contains one singular point of the function for the integration.

Speaker: Ted Swang, University of Oklahoma
Title: Diophantine Solutions to Adjacency Equations Associated with Graphs
Abstract: Let X be a graph on *n* vertices. The adjacency equation of X is formed by taking the sum of the squares of *n* variables minus twice the sum of the cross terms of adjacent variables equal to zero. I am interested in finding integer solutions to such equations. There is an operation called the *swap* that takes one integer solution to another by changing the value of one variable. Applying a sequence of these swaps produces an equivalence class of solutions. Does each equivalence class have a "best" representative solution? If so, what conditions guarantee the existence and uniqueness of such a solution? Example graphs will be examined.

Speaker: Lauren Smith, Oklahoma State University
Title: The Art of Mathematical Tiling
Abstract: A brief look at the history of monohedral tilings with convex polygons. Delving into tiling the plane with equilateral pentagons and introducing a pentagonal tiling with an equilateral pentagon. Prove that the pentagonal tiling tiles the plane with no gaps or overlaps. Will also show artwork that is inspired by the pentagonal tiling.

Session: Graduate

Speaker: Kazuo Yamazak, Oklahoma State University
Title: On Burger-related Equations
Abstract: We study some Burger-related equations such as existence and uniqueness of their solutions globally in time.

Speaker: Toshihisa Kubo, Oklahoma State University
Title: An example of a conformally invariant system of differential operators for $\mathfrak{so}(7,\mathbf{C})$
Abstract: It is well known that $\mathfrak{so}(4,2)$ acts on the Minkowski space $R^{3,1}$ via a multiplier representation σ and that the solution space of the wave operator $\Box$ is conformally invariant. In particular, when acting on sections of an appropriate bundle over $R^{3,1}$, the elements of $\mathfrak{so}(4,2)$ are symmetries of the wave operator, i.e., for $X \in \mathfrak{so}(4,2)$, we have $[\sigma(X), \Box] = C(X)\Box$ with C(X) a smooth function on $R^{3,1}$. Not every differential operator admits symmetries of this notion. Barchini, Kable, and Zierau introduce the notion of conformally invariant systems of differential operators. They built examples in Heisenberg setting of the system of operators that are quasi-invariant with respect to a Lie algebra. We generalize the construction to the maximal two-step nilpotent setting. In this talk we illustrate the construction in an example.

Speaker: Derek B. Rush, University of Central Oklahoma
Title: An Overview of 2-Banach Spaces
Abstract: A 2-Normed Linear Space is a natural two-dimensional analog to a Normed Linear Space. The definition and a brief overview of the properties of 2-Normed Linear Spaces are provided, as well as definitions and some interesting results concerning 2-Banach spaces. This talk is readily accessible to audience members who have a basic understanding of Vector Spaces.

Speaker: Juhyung Lee, Oklahoma State University
Title: A realization of unitary representations of GL(2n, R)
Abstract: The functional equation, known as the Fundamental Theorem of Prehomogeneous vector spaces, holds for Schwartz functions. I extend the same functional equation to a large class of functions so that we can construct a realization of unitary representations of GL(2n, R).

Speaker: Nathan Bloomfield, University of Arkansas, Fayetteville
Title: Local rings with genus 2 zero divisor graph
Abstract: To each commutative ring we can associate a graph, the zero divisor graph, whose vertices are the zero divisors and such that two vertices are adjacent if their product is zero. This graph gives a concrete measure of how badly the ring fails to be a domain. In the present work we classify up to isomorphism those rings having genus 2 zero divisor graphs.

Session: General

Speaker: Michael Lloyd, Henderson State University
Title: Polynomial Solver Algorithm Applied to the TIs
Abstract: The history of polynomial solvers for the TI calculators (TI-85 through nspire), and an explanation of a QR-based polynominal solver algorithm.
Speaker: Darryl McCullough, University of Oklahoma

Title: On the matrices AB and BA
Abstract: We will discuss functions of matrices that have the property that $f(AB) = f(BA)$.

Speaker: Fred Worth, Henderson State University
Title: Strong Law of Small Numbers
Abstract: Richard Guy developed what he called the Strong Law of Small Numbers. It basically dealt with mathematical patterns that appear to develop and how those patterns do not always continue. In this talk we will look at some interesting examples of this nature and try to decide if they are actual theorems or just a deceptive beginning.

Speaker: Daniel Pragel, University of Arkansas – Fort Smith
Title: Properties of Central Digraphs
Abstract: A *central directed graph*, or *central digraph*, is a directed graph with the property that, given any two (not necessarily distinct) vertices *x* and *y*, there is a unique vertex *z* such that $x \to z \to y$. There is a natural correspondence between central digraphs and algebraic objects known as *central groupoids*; these consist of a set *S* and a binary operation $\bullet$ such that, for any $a,b,c \in S$, we have $(a \bullet b) \bullet (b \bullet c) = b$. We will discuss this correspondence, as well as some of the basic properties of central digraphs and attempts at classifying those central digraphs of small order.

Speaker: James C. Price, University of Arkansas – Fort Smith
Title: The Resultant and Algebraic Numbers
Abstract: Some numbers are obviously algebraic, such as $\sqrt{2}$ or $\sqrt{3}$ since they are roots of $f(x) = x^2 - 2$ and $g(x) = x^2 - 3$. $\sqrt{2} + \sqrt{3}$ is also an algebraic number although the polynomial for which it is a root is not so obvious: $h(x) = x^4 - 10x^2 + 1$. Interestingly, this polynomial can be determined solely by the coefficients of f and g. In this talk, we will demonstrate how this works by using the resultant.

Speaker: Evan Linde and Darryl Linde, Northeastern State University
Title: The Great Internet Mersenne Prime Search
Abstract: A discussion of how the Great Internet Mersenne Prime Search works, how to get involved, and how to form a team.

Speaker: Dragan Jankovic Cameron University
Title: Mirrors, Means, and Logarithms
Abstract: I will talk about an intrinsic symmetry of the logarithmic curve involving classical means (arithmetic, geometric, and harmonic). In this context two curves arise: one old and famous (yielding pi and many other things), and other new (to me) and interesting (yielding Apery's constant).
Speaker: Nathan Ponder, Lyon College

Title: Interval Estimates of Proportions and Associated Probabilities

Abstract: During election season, pollsters obtain point estimates of the proportion of voters supporting each candidate in a race. The Central Limit Theorem is then used to establish intervals of values overwhelmingly likely to contain each candidate's actual support. One candidate is declared to be leading another if the lower bound of that candidate's interval estimate of support is greater than the upper bound of the opponent's. In this paper we first discuss the theory behind confidence intervals for proportions. We then present a method for computing the likelihood that a particular candidate will win a race if the candidate is a given number of points ahead or behind in a poll. This allows for a more robust interpretation of poll results.

Session: Analysis

Speaker: R. B. Deal

Title: Two Kernels, Distant Cousins

Abstract: Every random variable with all moments has a countable set of orthogonal polynomials. The Christoffel-Darboux formula defines the kernel. The Bohman-Korovkin theorem gives a somewhat different kernel. Some ties between them are given here.

Session: Topology

Speaker: Tom McNamara, Southwestern Oklahoma State University

Title: Connecting Linking Numbers

Abstract: Given an oriented link, there is an elementary procedure for computing the linking number from its projective diagram. We will show using the most elementary methods, why this procedure gives the same result as the linking number defined for two oriented manifolds.

Speaker: Andy Miller, University of Oklahoma

Title: Parabolic modular triangles

Abstract: An ideal triangle in the hyperbolic plane $\{z|\ \mathrm{Im}(z)>0\}$ is a parabolic modular triangle if its three vertices are rational points on the extended real line. Two such triangles are equivalent if there is a linear fractional transformation with integer coefficients (that is, an element of the modular group PSL(2,Z)) carrying one to the other. Each side in a parabolic modular triangle can be assigned a length and each angle can be assigned a measure. We will describe these invariants and then discuss basic principles of triangle geometry such as the angle/angle/angle law.

Speaker: Charles L. Cooper & Scott McClendon, University of Central Oklahoma

Title: An Introduction to Trilinability

Abstract: Given a curve, P, and a point $x \notin P$, x is said to be *m-trilinable* provided there are at least three distinct points of P at distance m from x. In this case x is referred to as a *trilinable point with respect to P*. If P is a simple closed curve which encloses a plane region, A, then P is *internally (externally) trilinable* if every point of $\text{int}(A)$ (resp. $\text{ext}(A)$) is a trilinable point with respect to P. The main results are that every regular polygon is internally trilinable with respect to the polygonal region it encloses, and that no regular n-gon is externally trilinable.

Speaker: Scott McClendon & Charles L. Cooper, University of Central Oklahoma

Title: (Trilinable) Properties of Conic Sections

Abstract: There is quite a bit of information known about the different conic sections. We will present another look at some of the properties of conic sections, and this new material is quite accessible for undergraduates. Specifically, for each of the conics, we will locate their respective trilinable points. A point x is trilinable to a conic C if there are three points a, b, c on C such that $d(a,x) = d(b, x) = d(c,x)$. We will also point out a fascinating relationship between the boundaries of the regions containing trilinable points and the radius of curvature of the conic.

Speaker: Andrew Bucki, Langston University

Title: Algebraic Methods in Topological Groups

Abstract: The study of properties of special endomorphisms of Lie algebras of some topological groups leads to geometrical properties of these groups.

Session: Algebra

Speaker: David Wright, Oklahoma State University

Title: Pascal's Grid

Abstract: This is a sequel to my `talk' from last year's conference about the Monthly problem #11380 proposed by Montgomery and Shapiro in 2008 about the oddness of the binomial coefficients $\binom{-1/3}{n}$. Since then, we have observed that their problem was a `slice' of a generalization of a famous bit of folklore about Pascal's triangle, namely, that the arrangement of the odd binomial coefficients generate an image (seen from increasingly far away) of the well known fractal Sierpinski's Gasket. We show the results of investigating this phenomenon for Pascal's grid of binomials $\binom{n+\alpha}{k+\beta}$ where α, β are fixed fractions and n, k range over all integers.

Speaker: Nicholas Zoller, Southern Nazarene University

Title: An Introduction to Galois Groups of CM Fields

Abstract: A CM field K of degree $2n$ is an imaginary quadratic extension of a totally real field K_0. A totally real field J is an extension of the rationals such that the image of any embedding of J into the complex numbers is contained in the real numbers. We will examine some of the basic properties of Galois groups of CM fields. Then we will see how these properties can be used to make a database of CM fields of a given degree.

Speaker: Daniel Pinzon, University of Arkansas – Fort Smith

Title: It's a Supermathematical World

Abstract: Supermathematics is an attempt to redefine classical mathematical objects to model physical particles that have both integer (bosons) and half-integer (fermions) spin. This is done at the infinitesimal level by grading the vector space $V = V^{even} \oplus V^{odd}$ and in any classical formula where two odd elements are interchanged, a minus sign is introduced. We discuss the consequences of these changes and what physical predictions they make.

Speaker: Frank Blume, John Brown University

Title: A Group Action Proof of Fermat's Little Theorem

Abstract: Given a prime number p and a positive integer n we use a group action on the set of all maps from the integers modulo p into the set $\{1,\ldots,n\}$ in order to prove that p divides $n^p - n$. Furthermore, we discuss how the argument thus given can be extended to obtain a more general divisibility property in the case where p is not a prime number.

Speaker: Boris M. Schein, University of Arkansas – Fayetteville

Title: Syntactic monoids

Abstract: Syntactic monoids is the second most applicable direction of semigroup theory (the first is semigroups of transformations). It is used in mathematical linguistics. We'll discuss what are the "parts of speech" (like nouns, adjectives, verbs, proverbs, pronouns, etc., etc.)

Session: Applied Math

Speaker: Jill E. Guerra, University of Arkansas – Fort Smith

Title: Using wavelets for authentication

Abstract: Wavelets are important tools used in a variety of applications, including signal processing and data compression. We will discuss the use of wavelets for authentication, including examples from forgery detection in handwriting and artwork.

Speaker: Thomas Cairns, University of Tulsa

Title: Motion analysis computer software demonstrated in a sample analysis of a sport skill

Abstract: One of the burgeoning fields of mathematical application is biomechanics. Notable examples are industrial biomechanics (e.g., repetitive motion syndrome prevention), medical biomechanics (e.g., modeling lower extremity responses to automobile crashes) and sports biomechanics (e.g., analyzing sports techniques). Motion analysis computer software has evolved as the principle analytic tool available to the biomechanist. In this talk I will demonstrate the process of using Ariel Performance Analysis System (APAS) from Ariel Dynamics and will show graphical and other output obtained in a sample analysis of a sport skill.

Session: Mathematics Education and Classroom Notes

Speaker: Ray Hamlett, Oklahoma Christian University
Title: The Intermediate Value Theorem Plus What Implies Continuity?

Abstract: It is shown that the Intermediate Value Theorem plus preservation of compactness implies continuity of functions from the reals to the reals.

Speaker: Charles Mullins, Arkansas School for Math, Sciences and the Arts
Title: Horner's Algorithm and Moessner's Property of Natural Numbers

Abstract: Actually there are several algorithms attributed to Horner. One gives a method of determining the coefficients needed to express a polynomial in powers of (x-n) for a given positive integer n. Another one gives a scheme for evaluating a polynomial at a given value of $x = x_0$ and this one can then be used to determine the decimal value of a number given in a different base. The talk focuses on these versions.

Speaker: Fred Worth, Henderson State University
Title: Baseball as the focus for a general education mathematics course - how it is working

Abstract: In 2005, I presented an outline of a proposed "sports-based" general education mathematics course. It was finally approved and I am teaching it now for the first time. I will discuss what is working, what is not, and some plans for change.

Speaker: David E. Boliver, University of Central Oklahoma & Mike Hall, Arkansas State University
Title: Mathematics Education in China Today

Abstract: We will present a video originally developed by Chinese math educators for presentation at the most recent International Congress of Mathematics Education. It lays out a new philosophical direction for the Chinese mathematics curriculum and this will provide a basis for the discussion to occur in a second session which we also propose.

Speaker: Mike Hall, Arkansas State University & David Boliver, University of Central Oklahoma

Title: Mathematics Education as it Evolves in China

Abstract: We will present a brief outline of things which are new and things which endure in Chinese mathematics education. This topic is important to us as we are often pressed by public opinion to adopt various aspects of Asian mathematics curricula, with Singapore being a noteworthy example. We intend to allow some time for discussion.

Speaker: Anita M. Walker, East Central University

Title: The Lost Arts: Have We Sacrificed Skills for the Sake of Electronic Stimulation?

Abstract: There was a time in the recent past when the three R's drove the educational process. With the ever-increasing emphasis on technology use in the classroom, what were once traditional topics in algebra and trigonometry have been replaced with often mindless button-pushing. This talk presents some of the 'lost arts' of mathematics and makes note of the basic skills that have suffered as a result of eliminating these 'arts' from teaching.

Speaker: Thomas Peter, University of Arkansas – Little Rock

Title: Using Induction on the Difference Quotient to Prove the Power Rule in Calculus

Abstract: We use induction on $nx^{n-1} = \lim_{h\to 0}\left[\frac{(x+h)^n - x^n}{h}\right]$ by using the identity

$$\frac{(x+h)^{n+1} - x^{n+1}}{h} = x^n + (x+h)\left[\frac{(x+h)^n - x^n}{h}\right].$$

Speaker: Jack L. Jackson II, University of Arkansas – Fort Smith

Title: Using Geometer's Sketchpad to Teach Mathematical Reasoning

Abstract: Geometer's Sketchpad is a powerful tool for investigating and illustrating concepts from a wide variety of mathematical areas. Because of the dynamic nature of the program it provides a level of justification somewhere between a few examples and an actual proof. We will investigate the uses of Sketchpad in developing mathematical reasoning skills and its relationship to a formal proof.

Speaker: Christopher Moretti, Southeastern Oklahoma State University

Title: Mathematica Manipulations in the Classroom

Abstract: In this talk I will demonstrate various interactive Mathematica manipulations used to improve understanding in various math courses.

Session: Special Session on the Teaching of Mathematics

Speaker: Clyde Greeno, MALEI Mathematics Institute
Title: Mathematics As Common Sense: Defragmenting the Concept of Slope
Abstract: As students progress through courses in pre-algebra, through basic, intermediate, and college algebra, and on into trigonometry, pre-calculus, and calculus, it is commonplace for their conceptual understanding of the slope-numbers for lines and curves to be too superficial for them to functionally grasp what slope has to do with the rest of whatever else they are studying. Clinical research discloses that a major factor is that, as a curricular theme, the notion of "slope" is traditionally developed in fragments … and that a "capstone" synthesis of the bits and pieces can empower students for digesting the usual presentations into personal common sense. In particular, clinical use of the "javelin" test and the "AP" test reveal that the classical "rise/run" and "dy/dx" developments largely fail to provide perception of slope-numbers as rates of climb … but that "javelin" and "AP" exercises impart the essence of slopes.

Speaker: Clyde Greeno, MALEI Mathematics Institute
Title: Mathematics As Common Sense: Defining Integration as Continuous Addition
Abstract: The curricular obscurity of integration is a major factor in causing students' first course in calculus to also be their last course in mathematics. Clinical research discloses that when the traditional syllabus eventually gets around to introducing calculus students to integration, they are given so little conceptual understanding that they cannot explain fundamental theorem, even if they can use it to perform the calculations. Clinical casework also discloses why that happens, and a way of greatly that dilemma. This presentation airs how the concept of integrals of functions may be conceptually derived from the (3^{rd} grade) process of column addition of whole numbers – thus challenging the American curricular tradition of delaying the introduction to integration until after covering differentials … which actually are "multiplication tables" that have variable multipliers (i.e. slopes)

Speaker: Vincent Dimiceli & LeighAnne Locke, Oral Roberts University
Title: Teaching Calculus with Wolfram|Alpha
Abstract: This paper describes the benefits and drawbacks of using Wolfram|Alpha as the platform for teaching calculus concepts in the lab setting. It is a result of our experiences designing and creating an entirely new set of labs using Wolfram|Alpha. We present the reasoning behind our transition from using a standard computer algebra system to Wolfram|Alpha in our differential and integral calculus labs, together with the positive results from our experience. We also discuss the current limitations of Wolfram|Alpha, including a discussion on why we currently still use a computer algebra system for our multi-variate calculus labs.

Speaker: Christian Constanda, University of Tulsa
Title: Rigor, Error, and Humor in the Classroom
Abstract: Is the earth flat? Can anyone afford a Porsche? Does the universe exist? A brief discussion of the absurdities that can be "proved" if absolute mathematical rigor is not emphasized enough in the classroom.

Speaker: Andrew Bucki, Langston University
Title: Less Teaching More Learning – New Educational Program
Abstract: This presentation will briefly introduce the new educational program "Less Teaching More Learning". The program includes elementary and more advanced mathematics. Some new pedagogical ideas and changes in content will be presented.

Speaker: Dan Bailey & Andrew Bucki, Langston University
Title: Less Teaching More Learning – Elementary Functions
Abstract: Some methods of the new educational program "Less Teaching More Learning" are presented and applied in teaching Precalculus.

Speaker: Ross Reza Pourdavood & Andrew Bucki, Langston University
Title: Less Teaching More Learning – Properties of Real Numbers
Abstract: This presentation provides a partial illustration of the new educational program "Less Teaching More Learning". It is a new approach in teaching Intermediate Algebra.

Session: Special Session on Math Competition Experiences

Speaker: David Wright, Oklahoma State University – Recipient of the 2009 OK-AR Section Distinguished Teaching of Mathematics Award
Title: Collegiate Problem Competitions
Abstract: We would like to talk about our experiences with the Putnam Competition and suggestions on how to approach supervising it and competing in it. While the day of the competition may be a long one of frustration (especially with final exams usually coming right after!), we agree with Gelca and Andreescu (Putnam and Beyond) that the process of preparing for the competition can be a thrilling enhancement to an undergraduate mathematic education, especially when combined with work on advanced challenging problems from journals such as the Monthly, Mathematics Magazine, etc. We hope other faculty and students will come and share their own experiences as well.

Session: Special Session on Computer-Aided College Algebra

Speakers: Douglas B. Aichele, Cynthia Francisco, Juliana Utley & Benjamin Wescoatt, Oklahoma State University

Title: Computer-aided College Algebra: A Research Study Conducted at Oklahoma State University

Abstract: **Overview.** *Computer-aided College Algebra: A Research Study Conducted at Oklahoma State University* is presented in four-parts. We will discuss in depth the motivation for the redesign of OSU College Algebra and the resulting delivery model being implemented, the research design and methodology employed, the analysis and discussion of data collected during 2008-09, and a question and answer forum.

1:00 **Part I - Motivation for Redesign and Description of Delivery Model**
We will discuss several of the motivating factors (e.g., student success rate, drop out rate, variability among sections, and delivery cost) for redesigning the traditional lecture-based College Algebra course. Additionally, we will provide a description of our model, which includes both face-to-face components (focus groups and tutoring lab) and computer components (e.g., View an Example) via MyMathLab.

1:20 **Part II - Research Design and Methodology**
We will 1) discuss the research questions framing our study, 2) share the research methodology used to investigate these research questions including our instruments, and 3) introduce our findings.

1:40 **Part III - Analysis and Discussion of Data on the Best Way to Learn and Beneficial Resources**
We will discuss student data pertaining to the statement "The Best Way to Learn College Algebra" and student characterizations of the "Least and Most Beneficial Components" in our redesigned delivery model.

2:00 **Part IV - Question and Answer Forum**
In this informal session, we will discuss 1) factors affecting implementation of our redesigned delivery model, 2) the status of our implementation, and 3) areas in need of further study. Participants are encouraged to share their computer-aided models or delivery models that are being considered at their institutions.