M*A*T*H COLLOQUIUM

Wednesdays 4 p.m. Darwin 103
Coffee, tea, and cookies @ 3:45 p.m.

Sonoma State University Department of Mathematics and Statistics presents a series of informal talks open to the public

"Mathematics is the process of turning coffee into theorems" Paul Erdös

Feb 6	**Fire in Our Midst (A Statistician's Perspective)**	Haiganoush Preisler, Pacific Southwest Research Station, USDA Forest Service
	As a mathematical statistician for the Forest Service I have worked on a variety of data analysis issues concerning wildfires. These range from studies on the effects of evolving climate on probabilities of forest fires to studies on the effects of fires on the quality of the soil under trees and the air above them. We will explore some of the statistical analysis techniques.	
Feb 13	**Predicting Sex of Golden Eagles Using Different Statistical Techniques**	Kathy Gray, California State University, Chico
	How do you tell the sex of a Golden Eagle? Since there are no external distinguishing characteristics, it's not as easy as you might think, and requires a blood test to determine definitively. We will look at three different methods for predicting sex of Golden Eagles, using footpad size and body weight, which are common measurements collected in the field. We will determine which statistical method has the greatest predictive power.	
Feb 20	**Thinking About Symmetry**	Christine Latulippe, Department of Mathematics, California State Polytechnic University, Pomona
	Is geometry about "2-column proofs" or is geometry about seeing the world around you in a different way? This talk is intended to help teachers and others gain insight into symmetry including its mathematical, natural, and cultural significances. Geometry - and especially symmetry - is all around us.	
Feb 27	**Measuring to the Stars: The Apotheosis of Trig**	Rick Luttmann, Department of Mathematics and Statistics, Sonoma State University
	We will describe the series of clever mathematical applications of triangle trigonometry which, along with some physics, allow us to infer distances to increasingly distant objects in the universe, beginning with the measurement of the earth and ending with the most distant galaxies. *Pizza after Talk*	
Mar 5	**The Space Of Evolutionary Trees and Upgma Algorithm**	Serkan Hosten, Mathematics Department, San Francisco State University
	An evolutionary (or phylogenetic) tree is like a family tree for species, showing possible evolutionary relationships between past and current species. There is a classical algorithm (UPGMA) that finds a "good" evolutionary tree given distance data between species (where distance is a measure of how much the DNA of these species differ). We will describe the way in which all possible phylogenetic trees form a geometric space, and show that the UPGMA algorithm performs an orthogonal projection to this space.	
Mar 12	**Population Genetics Model for Autism**	Joe Latulippe, Department of Mathematics, California State Polytechnic University, Pomona
	There are many questions about the prevalence of Autism in today's society. Many researchers consider genes to be involved in the Autistic Spectrum Disorder (ASD). In this talk we will investigate a basic mathematical model for genetic evolution and more specifically how it may relate to autism.	
Mar 19	**Student Projects from the Fall 2007 Math 180 Class**	Bill Barnier, Department of Mathematics and Statistics, Sonoma State University
	Amelia Beede, Karen Gladysz, Greg Morre, Y Vu, and Holly Wright will present Mathematica projects on planning your menu, trig function graphs, the game of war, finding the best size containers, and paying off your loans. *Pizza after Talk*	
Mar 26	**Spring Break–No Talk**	
Apr 2	**The Petersen Graph: The Tale of the Famous Graph**	Izabela Kanaana Department of Mathematics and Statistics, Sonoma State University
	The Petersen Graph is a cubic graph with 10 vertices and 15 edges, which has fascinated mathematicians for many years. It serves as a useful example and counterexample for many problems in graph theory, giving it a unique place in the field. In this talk we will discuss the origins of the Petersen graph and its most interesting properties. *Pizza after Talk*	
Apr 9	**Easy-to-Explain But Hard-to-Solve Problems in Polyhedral Geometry**	Jesus DeLoera, Mathematics Department, University of California, Davis
	Examples of polyhedral sets are cubes and triangles. These are figures that do not have "holes" or "valleys" and flat surfaces. Polyhedra are finding more and more applications in such diverse fields as optimization, statistics, algebra, and computer science. In this talk we will convince the audience that there is life after calculus and that even the most seasoned of mathematicians can't solve easy-to-understand questions about polyhedra	
Apr 16	**Cyclotomic Polynomials and the Length of the Repeated Portion of Decimal Fractions**	Dean Gooch, Mathematics Department, Santa Rosa Junior College
	Why is it that when writing the decimal representation of 1/47 it does not repeat until after the forty-sixth digit? It only takes five digits for the decimal expansion of 1/41 to repeat! A simple method for determining the lengths of the repeated portions of fractions using cyclotomic polynomials will be given. No previous knowledge of cyclotomic polynomials is needed. Only the usual factoring techniques and some knowledge of prime numbers will be assumed.	
Apr 23	**From Flapping Birds to SpaceTelescopes: The Modern Science of Origami**	Mathematics Festival Day
	Robert Lang, Robert J Lang Origami; Editor in Chief, IEEE Journal of Quantum Electronics	
	The last decade of this past century has been witness to a revolution in the development and application of mathematical techniques to *origami*, the centuries-old Japanese art of paper-folding. The techniques used in mathematical origami design range from the abstruse to the highly approachable. In this talk, I will describe how geometric concepts led to the solution of a broad class of origami folding problems – specifically, the problem of efficiently folding a shape with an arbitrary number and arrangement of flaps - and along the way, enabled origami designs of mind-blowing complexity and realism, some of which you'll see, too. As often happens in mathematics, theory originally developed for its own sake has led to some surprising practical applications. The algorithms and theorems of origami design have shed light on long-standing mathematical questions and have solved practical engineering problems. I will discuss examples of how origami has enabled safer airbags, Brobdingnagian space telescopes, and more. (Math Festival Dinner follows)	
Apr 30	**What do Students Learn in Statistics?**	Brian Jersky, Dean of Science, Saint Mary's College of California
	Recent research in statistics education has investigated what students bring to the typical undergraduate introductory statistics class (more than you might think) and what they take away from it (less than you might think). In this talk, I will review the research and show how the results might inform our teaching of the subject.	
May 7	**Investigating Psychic Phenomena with Statistics**	Jessica Utts, Department of Statistics, University of California, Davis
	Anecdotal stories about phenomena such as telepathy (mind to mind communication) and precognition (knowledge of the future) are intriguing and compelling. But they do not constitute solid evidence for these phenomena because in any given case, random events or normal methods of communication can provide alternative explanations. For several decades, scientists have been studying these alleged abilities using well-designed experiments and simple statistical methods. This talk will cover the basics of these experiments and the statistical methods used to analyze them, and speculate on what can be concluded from this research. *Pizza after Talk*	

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Talks may change: Please confirm with the Department of Mathematics and Statistics before a specific talk