

M*A*T*H COLLOQUIUM

The Mathematics Department of Sonoma State University presents a series of informal talks open to the public.

"Mathematics is the process of turning coffee into theorems" -Paul Erdős

WEDNESDAYS at 4:00 P.M.

DARWIN HALL ROOM 108

COFFEE at 3:45 P.M.

- FEBRUARY 6** **TITLE: A VIEW OF AN ART GALLERY** Jean Bee Chan, Professor of Mathematics, Sonoma State University, will discuss the Art Gallery Question: How many surveillance cameras are needed so that every point in the gallery is seen by some camera?
- FEBRUARY 13** **WHAT IS AN ACTUARY?** Diana Carroll and Julie Duncan of Towers Perrin, will discuss the actuarial profession. They will explain what an actuary does, what actuarial exams are all about, and what you can do now to prepare for an actuarial career. Typical projects in actuarial consulting will also be presented. This is your chance to find out why the Wall Street Journal has consistently ranked the job of an actuary as the number 1 or 2 job in the U.S. Questions from the audience will be welcomed and encouraged.
- FEBRUARY 20** **MATHEMATICA TOOLKITS** Bill Barnier, Professor of Mathematics, Sonoma State University, will introduce student projects done for the Fall 2001 Math 180 class. Kim Asuncion, Laura Chrisco, Marie Artesse, Maria Capetanos, Debbie Koehler, Kimberly Laabs, Izaak Eberst, Michael Laufer, Aba Mbirika, and Paul Taylor will exhibit colorful and accessible Mathematica programs that demonstrate applications of mathematics in a variety of areas.
- FEBRUARY 27** **HISTORY OF THE WESTERN CALENDAR** Jim Pedgrift, Professor of Mathematics, Sonoma State University, will trace the history of the Western Calendar from pre-history to 1582 C. E., when our modern calendar was given final form. We will see how an elementary understanding of mathematics can inform and deepen our understanding of history.
- MARCH 6** **ELLIPTIC CURVE CRYPTOGRAPHY** George Ledin, Professor of Computer Science, Sonoma State University. The U.S. government will be switching to elliptic curve cryptography for all its public key cryptography, plans to buy from the commercial sector, and will require higher levels of assurance than is usually demanded of commercial software. What is cryptography? What is Elliptic Curve Cryptography? What are Elliptic Curves and why are they used in cryptography? Why should such topics be studied by computer scientists, mathematicians, and engineers? Professor Ledin will attempt to answer these questions and others.
- MARCH 13** **BASIC NON-LINEAR EQUATIONS** Enrique Izaguirre, Professor of Physics And Astronomy, Sonoma State University. Nonlinear equations and its applications in physics and biology: A brief overview of the theory of discrete and differential nonlinear equations is presented. This introductory lecture is an exploration of the applications of nonlinear equations in nonlinear optics, fluids, neurobiology, and pattern formation. During the talk, the outlines of a collaborative undergraduate research program at SSU will be discussed.
- MARCH 20** **AN INTRODUCTION TO CHAOS THEORY** Rick Luttmann, Professor of Mathematics, Sonoma State University, will talk about the origins of the subject with Poincare in the late 19th century, studying the three-body problem; developments in the 20th, including the work of Mandelbrot (fractals, and the set that bears his name), Lorenz (weather prediction and strange attractors), and Feigenbaum (the cascade of bifurcations). Professor Luttmann will discuss some of the applications of this rich new theory to the sciences -- everything from economics (stock prices) to astronomy (formation of galaxies), quantum physics (atomic structure) to medicine (heartbeat rhythms) -- which have been united by this subject as they haven't been since the calculus in the 17th century
- MARCH 27** **CONFIDENCE INTERVALS FOR A BINOMIAL PARAMETER** Brian Jersky, Professor of Mathematics, Sonoma State University. In elementary statistics, a confidence interval for the proportion of successes in a series of Bernoulli trials is developed. This interval is easy to present and motivate and to compute. Unfortunately, it is not safe to use, as the actual coverage probability of the interval fluctuates widely compared to the claimed coverage. Alternative intervals are presented which are more reliable, though somewhat more difficult to calculate.
- APRIL 10** **PLUS AND TIMES, PI AND PRIMES** Henrik Lenstra, University of California, Berkeley, and Universiteit Leiden. There is an easy recipe for achieving fame and wisdom. The speaker will explain how anybody familiar with the ABCs of arithmetic can help mathematics make progress.
- APRIL 17** **STEINER SYMMETRIZATION AND PETTY'S PROJECTION BODY CONJECTURE** Sam Brannen, Professor of Mathematics, Sonoma State University. In 1971 Petty conjectured a minimum value for the ratio of the volume of a projection body to a certain power of the volume of the original convex body, with the minimum value attained only by convex bodies affinely equivalent to a ball. A series of Steiner symmetrizations can turn any convex body into a ball, and therefore Petty's conjecture can be proven by showing that Petty's ratio is always decreased by Steiner symmetrization. We will show that for three-dimensional convex rotation bodies, the value of Petty's ratio is decreased by a particular Steiner symmetrization.
- APRIL 24** **VEDIC MATHEMATICS** Sunil Tiwari, Professor of Mathematics, Sonoma State University, will talk about Vedic Mathematics. "Veda" is a Sanskrit word meaning the fountainhead of unlimited store-house of all knowledge. According to the Hindu religion, the Vedic period goes back to 4000 BC. The four Vedas and four Upavedas contain all the knowledge that mankind needs to know. One of the Upavedas -- *Sithapatyaveda*, is an encyclopedia on engineering and mathematics. We will go over some of the *Sutras* (mathematical formulae and tricks) from *Sithapatyaveda*. This talk is accessible to all students.
- MAY 1** TBA



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Talks may change. Please confirm with the Mathematics Department before a specific talk.