M*A*T*H COLLOQUIUM

**Sonoma State University Department of Mathematics and Statistics
presents a series of informal talks open to the public**
"The first thing to understand is that mathematics is an art." -Paul Lockhart

Every Wednesday at 4:00pm in Darwin 103. Coffee, Tea & Cookies at 3:45pm in Darwin 103.

Phone: (707) 664-2368   www.sonoma.edu/math

Jan 29

Circles in Polygons: Letting One Question Lead to Another ....Tyler Evans, Humboldt State University

The purpose of this talk is to illustrate the ways that answering a question in mathematics (always?) leads to other questions. In particular, we will look at how a puzzle posted on @mathminute led the speaker and a student to a series of questions about certain collections of circles circumscribed by regular polygons. The ideas in the talk are accessible to anyone with some knowledge of right-triangle trigonometry and a tiny bit of first semester calculus. Audience participation will be strongly encouraged, and students of all levels are particularly encouraged to attend.

Feb 5

Mathematics for Global Environmental Citizenship ....Daniel Soto, SSU Geography, Environment, and Planning

Students are attracted to energy and environment majors because of the relevance of the material to pressing global problems. A significant fraction of students are surprised and challenged by the quantitative nature of the course material. To address this gap, previous faculty devised an applied mathematics course to bolster students' discipline-specific quantitative skills. My talk will detail my experiences and observations helping students apply the beauty and power of mathematics to our environmental challenges as well as my progress on new teaching activities using environmental justice and climate change data sets.

Feb 12

Applications of Group Theory in Theoretical Physics ....Alexandra Miller, SSU Physics & Astronomy

In this talk, I will introduce the field of group theory and discuss a variety of its applications to different physical models. Specifically, I will touch on its utility in relativity, quantum mechanics, and particle physics. We will see that symmetry (and therefore group theory) is fundamental to modern approaches in theoretical physics.

Feb 19

Applications Development & the Utilization of Statistics in the Manufacturing Industry .... Martine Miller, Arcturus UAV

This talk will explore the challenges faced by a FileMaker developer working for a cutting-edge manufacturing company in the aerospace and defense industries. I will discuss how I perform and troubleshoot daily tasks at work such as tracking all part items through serialization, tracking and validating data, analyzing and reporting on data to inform policy and procedure, creating applications to both, improve workflow and data collection, and quickly learning new programming languages and applications. This talk will show that a degree in mathematics or statistics can provide the skill sets necessary for a broader career path beyond analytics and statistics.

Feb 26

An Introduction to Scheduling Problems and How to Solve Them .... Fabian Santiago, UC Merced

Scheduling is a form of decision making or optimal sequencing of tasks. In this talk I will introduce the mathematical modeling of discrete scheduling problems and detail some applications. The talk will conclude with an introduction to the simulated annealing and genetic algorithm for solving such problems.

Mar 4

The Joy of Modeling and Statistical Consulting! .... Math 367 & 470 Students

Modeling without clay or glue? Serving as a consulting statistician? We'll see both. Come see amazing student projects from Martha Shott's Mathematical and Statistical Modeling course and Rodrigo Gaitan's Statistical Consulting course. Learn about applications of matrices, differential equations, regression, and statistical analyses to natural systems, school fitness programs, and more!

Mar 11

A Comparison of Statistical Models for Longitudinal Data .... Judith Canner, CSU Monterey Bay

The procedural aspects of statistical modeling are often well-defined once a model type is selected, but often, researchers do not consider the impact of model type on their interpretation of the data. We will explore how model type impacts the discovery of information in a case study observing the longitudinal behavior of problem drinkers. We will explore several common model types used to evaluate longitudinal data. In addition, we will explore how model choice can impact our evaluation of model features. Specifically how we quantify the effectiveness of different interventions, such as medication and therapy, for problem drinkers.

Mar 18

No Talk—Spring Break

Mar 25

Fraction Sense: What is it and why is it important? .... Julie MacNamara, CSU East Bay

Students' understanding of fractions and other rational number topics is a strong predictor of their success with algebra and beyond. Many practices that are commonly employed in the elementary and middle school classroom however, lead to confusion, limited understanding, and in many cases, fear of the topic. This talk will highlight some of the common challenges students face when working with fractions as well as present a lens for teaching and learning about fractions that builds on what students already know and can do with whole numbers and helps them develop their "fraction sense."

Apr 1

An Abundant Exploration .... Nick Dowdall, SSU

What are abundant, deficient and perfect numbers and how do they behave? We will explore the abundance function and its mapping from $\mathbf{N} \rightarrow \mathbf{Z}$ in this undergraduate-accessible talk.

Apr 8

Buffon's Needle and the Angle of Independence ....Cornelia Van Cott, University of San Francisco

Is lecture moving slowly? Drop a toothpick on your notes. What is the probability that the toothpick falls in a position where it crosses one of the lines of your notebook paper? A version of this question was posed nearly 250 years ago by George Louis Leclerc, Comte de Buffon. The question—now known as Buffon's Needle Experiment—has a rather satisfying answer involving π. We'll discuss the solution, and then we will extend this simple problem in several directions. As we do, we'll encounter further nice results plus a few surprises.

Apr 15

The Spiritual Side of Mathematics .... John Martin, Santa Rosa Junior College

Many people view mathematics as cold and sterile, not possessing a soul. Can the patterns and ideas in mathematics strengthen our spiritual perspective? In this talk we will explore some of the spiritual characteristics of mathematics. Along the way we will encounter some beautiful math.

MATH

Apr 22

Lessons for Mathematics Teaching & Learning Seen Through a Storytelling Lens .... Erica Walker, Columbia University

Many mathematicians and mathematics educators want to make mathematics more appealing and attractive to people of all ages. In this interactive talk, I will share key lessons for maximizing mathematics interest and engagement, using storytelling as one medium.

FEST

Apr 29

The Statistics Behind "Driving While Black".. Omayra Ortega, SSU

Together, we will review publicly available data on police automobile stops and the subsequent outcomes, and use statistics to examine whether "African-Americans are more likely to be pulled over by the police than other races."

Series supported by Instructionally-Related Activities Funds