

# A Presentation by **Dr. Francis Edward Su**

HARVEY MUDD COLLEGE

## **V** **TING IN AGREEABLE SOCIETIES**



**W**hen do majorities exist? How does the geometry of the political spectrum influence the outcome? What does mathematics have to say about how people behave? When mathematical objects have a social interpretation, the associated theorems have social applications. We give examples of situations where sets model preferences, and prove extensions of classical theorems on convex sets such as Helly's theorem and Turan's theorem that can be used in the analysis of voting in "agreeable" societies. This talk also features research with students.

Dr. Su earned his Ph.D. from Harvard University, and his research is in geometric combinatorics and applications to the social sciences. He has co-authored many articles with college students. He also has a passion for teaching and popularizing mathematics. From the Mathematical Association of America (MAA), he received the 2001 Merten M. Hasse Prize for expository writing, the 2004 Henry L. Alder Award for distinguished teaching, and was the 2006 James R.C. Leitzel Lecturer. He just completed a term as First Vice-President of the Mathematical Association of America. In his spare time he enjoys working on his "Math Fun Facts" website, which receives over a million hits each year, and most recently an iPhone app by the same name.



## **Justin Gottula** FULLERTON COLLEGE

**Is a sigma-field in a set  $X$  always, ever, or never closed under a quandle operation on the power set of  $X$ ?**

Every knot induces an abstract mathematical object called a quandle (induced by the given knot). One can formulate many new, basic questions about possible connections between a quandle on the power set of a set  $X$ , and sigma-fields in  $X$ . Recently, Mr. Gottula, who is an

ENGAGE in STEM Summer Research Intern mentored by Dr. Clahane, independently found an algorithm that generates all quandle multiplication tables for sets up to size 5, with 6 on the verge of being computationally complex. A Georgia Tech research group recently did the same for sets up to size 9. It is natural to ask whether or not sigma-fields, which Mr. Gottula will define, in  $X$ , are closed under quandle operations on the power set of  $X$ . Mr. Gottula will discuss the generated quandle tables and possible future optimization strategies to analyze this question for larger sets.

## **MATH COLLOQUIUM**

**Thursday, September 13, 2012**

12:45 -2:50 p.m. in Room 623

Lecture and Discussion

Refreshments will be served

Math Colloquia are held jointly with meetings of Math 295 Mathematics Seminar (new course!) and the Math Club



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