Vol 24 No 5
March 2016

# TCU Math Newsletter

*The present state of affairs is intolerable. Just think, the definitions and deductive methods which everyone learns, teaches and uses in mathematics, the paragon of truth and certitude, lead to absurdities! If mathematical thinking is defective, where are we to find truth and certitude?*

*- David Hilbert*

## Thomas Banchoff to Speak at the TCU Math Colloquium on Friday, March 18

Professor Thomas Banchoff of Brown University will be the next speaker in the Frank Stones Colloquium series. Professor Banchoff is a well-known mathematician and an excellent speaker. He is a former President of the Mathematical Association of America.

The title of Professor Banchoff's talk is "Is That a Cylinder or a Mobius band?" In this talk, he will develop seven different visual ways to distinguish whether a strip neighborhood of a curve on a surface is an oriented cylinder or a non-orientable Möbius Band based on models and computer graphics demonstrations of singularities of projections of surfaces and self-intersections as well as a new characterization in terms of inflections. The talk will be illustrated by computer graphics images and animations.

The talk will be at 3:30 pm on Friday, March 18 in Tucker 245, and refreshments will be served at 3:00 pm in Tucker 300.

## TCU Math Course Offerings

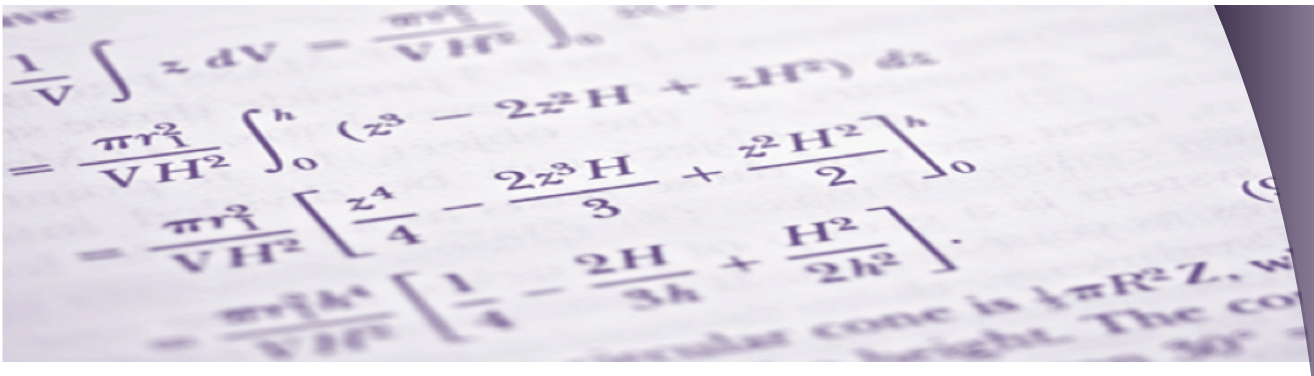
In addition its regular Fall offerings, the Math Department will offer Complex Analysis and Graph Theory in the Fall 2016 semester. It will also offer a new Foundations of Proof course designed to help prepare students to take Real Analysis and Abstract Algebra. This course is open to students who plan to take these Real and Abstract Spring 2017 or later and will have a Calculus II prerequisite. Please consult you advisor when you go in for advising.

The Department web site now has a list of anticipated course offerings for the next four years, along with some advising tips, at http://mathematics.tcu.edu/current-undergraduate-students/

## Applications for 2016-2017 SERC Undergraduate Research Grants Due March 18

The TCU Science and Engineering Research Center (SERC) will be awarding research grants for the 2016-2017 academic year to undergraduate students engaged in research with faculty in the TCU College of Science and Engineering. The grants will range from $500 to $1500 depending on the needs of the proposed research project. Student applicants must have junior or senior standing with anticipated graduation in May 2017 or later, although exceptions can be made for highly qualified sophomores with the recommendation of a faculty mentor.

The application form for the SERC Undergraduate Research grants and additional information is available on the SERC web site www.serc.tcu.edu. Students interested in applying should contact a faculty member in the college to see if he or she would serve as a faculty mentor, and be sure to apply by the March 18, 2016 at 4:00 pm deadline.



## Solution to the February 2016 Problem of the Month

**Problem:** Let $m$ and $n$ be integers, each at least 3. Suppose each square of an $m \times n$ checkerboard has either a white or a black checker and that there are not three squares in a row, horizontally or vertically, that have checkers of the same color. Prove that there are always two adjacent squares whose checkers may be switched to obtain three checkers of the same color in a row.

**Solution:** It suffices to look at any 3-by-3 sub-board. The middle row must contain two of one color and one of the other. We may assume it has two white checkers. Then the column with the black checker must have at least one white checker, which may be switched with the black checker to obtain three white checkers in a row.

The February Problem of the Month was solved by Brad Beadle '96 and Jeff Bond '12 (M.S.). Qi An was inadvertently left off the list of solvers of the November Problem of the Month.

## March 2016 Problem of the Month

This month's problem was suggested by Brad Beadle, who heard it from a colleague. A 10-by-10 inch square cake is 2 inches thick. It is iced evenly on the top and sides. Show how to cut the cake into 9 pieces so that each piece has the same amount of cake and frosting.

Students and others are invited to submit solutions to Dr. George Gilbert by e-mail (g.gilbert@tcu.edu) or hard copy (Math Dept. Office or TCU Box 298900). Correct solutions submitted by persons who are not members of the TCU math faculty will be acknowledged in the next issue of the newsletter. Note that a correct solution is an answer and a justification of its correctness. The solution to the problem will be published in the next edition of the newsletter.

Editor: Rhonda Hatcher
Problem Editor: George Gilbert
Thought of the Month Editor: Robert Doran