

1056-A0-15

**David T. Kung\***, Saint Mary's College of Maryland, Department of Mathematics, St. Mary's City, MD. *How math made modern music ~~mad~~ irrational!*

The scale used by 20th century classical musicians is strikingly different from that used in Bach's time. In fact, over the past 500 years, a wide variety of scales have permeated Western music. Amazingly, none of them was "in tune"! In fact, in some sense, no piano is **ever** in tune.

The reason for this is purely mathematical.

Starting with a single vibrating string, we'll use some physics and some advanced mathematics to make sense of the various sounds a violin can make. Add to the mix a little music theory and some basic arithmetic, and we'll be able to construct several different scales and see what's "wrong" with each one. Finally, by constructing the modern scale, we'll be able to answer the question posed in the title.

Throughout the talk, these concepts will be illuminated with excerpts played on the violin, including passages from Bach, Mendelssohn, and a few more modern composers. (Received May 05, 2009)