

# Graduate Math and Physics Seminar

*The Secret behind the Squiggles: A Guitar with Optimally Curved Frets*

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**Abstract:** The owner of Sweetwood Guitar Company asked a mathematician (that would be me) to help locate the placement of fret positions on a special guitar. He was designing a guitar with "curved frets" which corresponded to an irregular tuning system, meaning that notes were not equally spaced so the frets could not be parallel line segments. The design was a modified version of a tuning for harpsichord conjecturally used by J.S. Bach. In this talk, we will discuss: (1) tuning systems from a mathematical perspective, (2) why certain tuning systems are better than others for a given purpose, and (3) how one can use linear algebra and the theory of group actions [in particular, counting and studying orbits] to derive optimal irregular tunings for any given style of music. This work is joint with Mitchell Chavarria and was partially supported by the NSF through the PUMP program award DMS-1247679.

*When:* Monday, April 15th, 2019, 6:00 – 6:50 pm

*Where:* CSUCI, Sierra Hall 2411