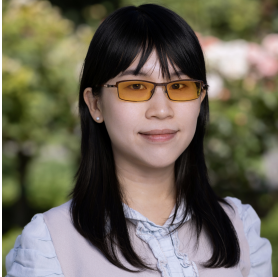




The Math/Stats Colloquium  
Department of Mathematics and Statistics  
San José State University



## Chi-Yun Hsu

Santa Clara Univ.

*Mathematics in musical tuning*

WED MAY 01, 2024, MH320

**Abstract:** The pitch of a sound is determined by its frequency. Human ears perceive two sounds as in harmony when the ratio of their frequencies is a small integer multiple. This led to the development of 5-tone and 7-tone scales, independently by many ancient civilizations. To accommodate the need for convenient tonality changes, the ratio of the frequencies of neighboring tones must be equal. Hence the 12-tone equal temperament was introduced and became the most widely-used tuning system. We will talk about how people axiomatized these classical tuning systems in mathematical languages, which generalized to the notion of regular temperament. Like other alternative tuning systems, regular temperament offers numerous possibilities for creating new music.

*Background:* One semester abstract algebra.

**About the speaker:** Chi-Yun Hsu is an Asst. Prof. in the Dept. of Mathematics and Computer Science at Santa Clara Univ. She completed her PhD at Harvard Univ. in 2019. Her research is in Number Theory, specifically  $p$ -adic modular forms. When she is not busy with work, she likes to play the piano.

SNACKS IN MACQUARRIE HALL 331B AT 2:40PM

TALK STARTS AT 3:00PM

For more information, see our full schedule at:

<http://www.timhsu.net/colloq/>