Math, Music and Coding Camp
July 10-14, 2023 | $1,200

Department of Mathematics

DREXEL UNIVERSITY
College of
Arts and Sciences

Overview

Students in **Drexel's Math, Music and Coding Camp** will investigate harmonic questions through the lens of mathematics. In this one-week non-residential program hosted by the Department of Mathematics, we'll explore how math can help us make sense of different aspects of sound and music. Each day, students will apply musical and mathematical concepts using a coding platform called Sonic Pi, an open-source, live coding language for music creation and performance used by professional musicians, VR developers and programmers. This program is open to students regardless of musical background. We will be using algebra and trigonometry, but calculus is not a prerequisite.

Have you ever wondered why music sounds the way it does? Why do some sounds make us feel joyful and others melancholy? Students who attend Drexel's Math, Music and Coding Camp will investigate these harmonic questions using a coding platform called Sonic Pi.

Program Details

DATES/TIME	July 10-14
LOCATION	Drexel University, Philadelphia, PA
FORMAT	In-person, non-residential, meals included. Students must cover transportation to/from program site.
COSTS	$1,200
ELIGIBILITY	Rising high school juniors and seniors.
DEADLINE	June 1 , 2023
QUESTIONS?	Email coas@drexel.edu
FEE WAIVER	Participants who apply to Drexel University will receive an undergraduate application fee waiver.

SAMPLE SCHEDULE – July 10-14, 2023

Program content and sequence may change due to weather, staff schedules or other circumstances.

What to Bring: Laptop, headphones, notebook

Day 1 – Pythagorean Tuning System

- Introduction to tuning systems
  - » Pythagorean tuning
  - » Just intonation
- What we hear: the mathematics of the four main attributes of sound
- Coding introduction
  - » Writing your first bit of "musical code"

Day 2 – Western Music Theory

- Chords, Scales, and Rhythm
- How modern (western) music theory evolved from the Pythagorean system
- Using mathematics to explain why/how we build chords and scales like we do
- Implementing chords and scales with code
  - » **Mini project 1:** write a melody with a chord progression

Day 3 – Outside the Box

- Looking at non-Western/European music theories
- Using mathematics as a bridge between different musical cultures
- Applying different techniques of composition with code
  - » **Mini project 2:** Making music with non-Western scales and rhythms

Day 4 – Sampling

- Working with non-musical sounds to make music
- Exploring the mathematics behind sampling, adding effects, and modifying recorded sounds
- Working with "found sounds"
  - » **Mini project 3:** Record a non-musical sound and make something musical out of it with code

Day 5 – Recital Day!

- Spend the first half of the day refining our final compositions.
  - » Bring together everything from the first four days
- After lunch we'll have our recital where we'll each share what we worked on and what we hope to learn and do next