

My phrase of the week is “the sonification of data,” or maybe I just like the key word itself, sonification. I heard a radio segment this week on NPR’s Science Friday program during which the question was posed, “What does outer space sound like?” We’ve all heard that if you scream in space, no one will hear you. Space is a vacuum, so sound waves don’t have anything to bounce off. Apparently, that doesn’t necessarily mean that space is silent. A team of researchers are taking data from a variety of telescopes and assigning them sounds, creating song-length “sonifications” of beloved space structures like black holes, nebulae, galaxies, and beyond. Their album called “Universal Harmonies” aims to bring galaxies to life and allow more people, such as those who are blind and low-vision, to engage with outer space. I’m listening to the album as I write this column and it is, to say the least, extraterrestrial. Two of the scientists behind “Universal Harmonies” were interviewed: Dr. Kimberly Arcand, a visualization scientist at NASA’s Chandra X-ray Observatory, and Dr. Matt Russo, astrophysicist and musician at the University of Toronto.

What qualifies as music? If a basic definition of music is that it is an intentional, patterned sound that humans recognize as expressive art, the data-generated sounds representing space as “sonified” by these scientists would seem to qualify. What about the whale songs that were part of Judy Collins’ performance of the song “Farewell to Tarwathie” on her “Whales and Nightingales” album? I once heard an album made up entirely of insect sounds recorded and somewhat manipulated to great effect. Music or just random, unintentional sounds?

The history of music stretches back to our earliest days, when rhythm and melody emerged through clapping, drumming, and simple flutes carved from bone. Ancient civilizations developed scales, instruments, and theories that shaped cultural expression. Medieval Europe saw the rise of notation, Gregorian chant, and polyphony, leading to the rich harmonies of the Renaissance. The Baroque, Classical, and Romantic eras advanced orchestral and operatic traditions. The 20th century brought us jazz, blues, rock, and electronic music, expanding global sounds and making music a universal language of expression.

According to Dr. Russo, there is a connection between space and music. “For centuries, it seemed almost obvious that there would be some connection between the cyclical patterns in both the universe and in music, and particularly the harmony of both,” he said. He added, “It turns out there is a lot of overlap because music and astronomy both have a lot to do with repeating cycles and listening or observing how those cycles interact with each other.”

The interviewer asked, “What does it mean to you as an astrophysicist to hear outer space?” Dr. Russo replied, “It’s always very exciting when you have a data set and you have some idea for how it’s going to turn out, but you never really know until you design the algorithm, you write the code, and then you press Run, and you just sit back and listen to what’s in that data. As an astrophysicist, but also as a musician, I just also find it very exciting that there are several connections between music and astronomy. There are real sound waves happening in space that can’t travel to us because there’s too much of a vacuum, but there are stars, dust clouds with gas, and sound can travel through those objects. So I find it interesting from that perspective, that it’s breaking that common idea that there’s literally no sound in space when that’s not quite true. It’s just that sound has a hard time traveling through space.” You can find samples from “Universal Harmonies” on the internet.