

44100

Jason Adleberg

For my project,

I wanted to use music as a generative source for form finding. However, particularly with this project, I wanted to avoid any abstraction, by using a process that a computer could understand. Instead of creating space by relating form to human, emotional properties of sound, like happy or sad, dark or mellow, I wanted to take advantage of Grasshopper's computational abilities to produce something from real data points, instead of abstracted views.

Fortunately, sound waves offer us a very, no-nonsense set of data points: amplitude, for sound is just amplitudes over time. With that being said, I decided to create a space out of sound, by literally taking amplitudes and spreading them into more than one direction.

Most recorded music is sampled at a rate of 44.1 kHz, which is to say that for a second of sound stored on a computer, there are 44,100 data points that tell the speakers the amplitude at which to be, every 1/44,100th of a second. Unlike emotional qualities of music, making sense of such a large number would be near impossible for a human to understand. So with that in mind, I came up with a goal: make a space out of a whole second of sound; create space from an otherwise uncomprehensible array of data points. 44,100.

First, I found four different one-second clips of sound I thought would be interesting:

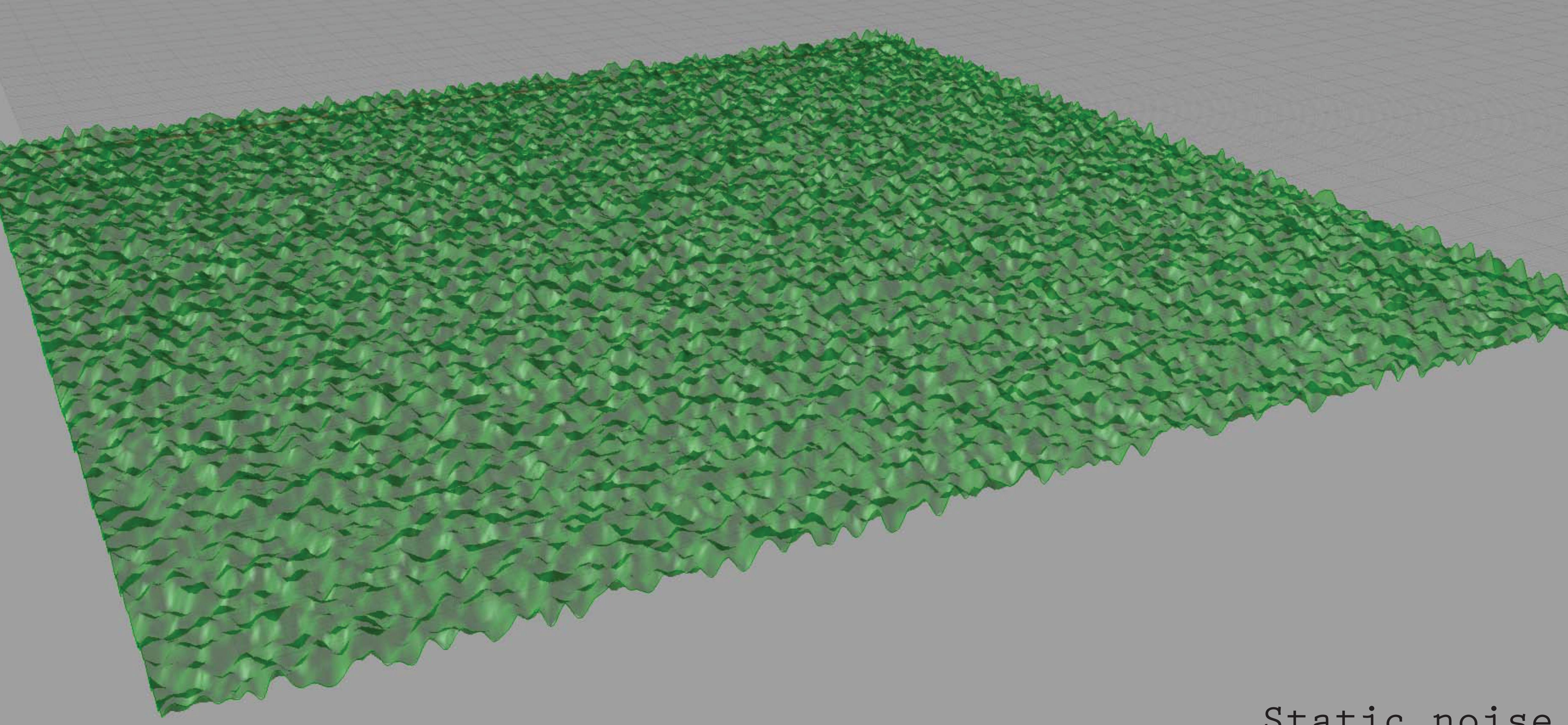
1. Static noise

2. A perfect, computer generated sine wave at 440Hz (A)

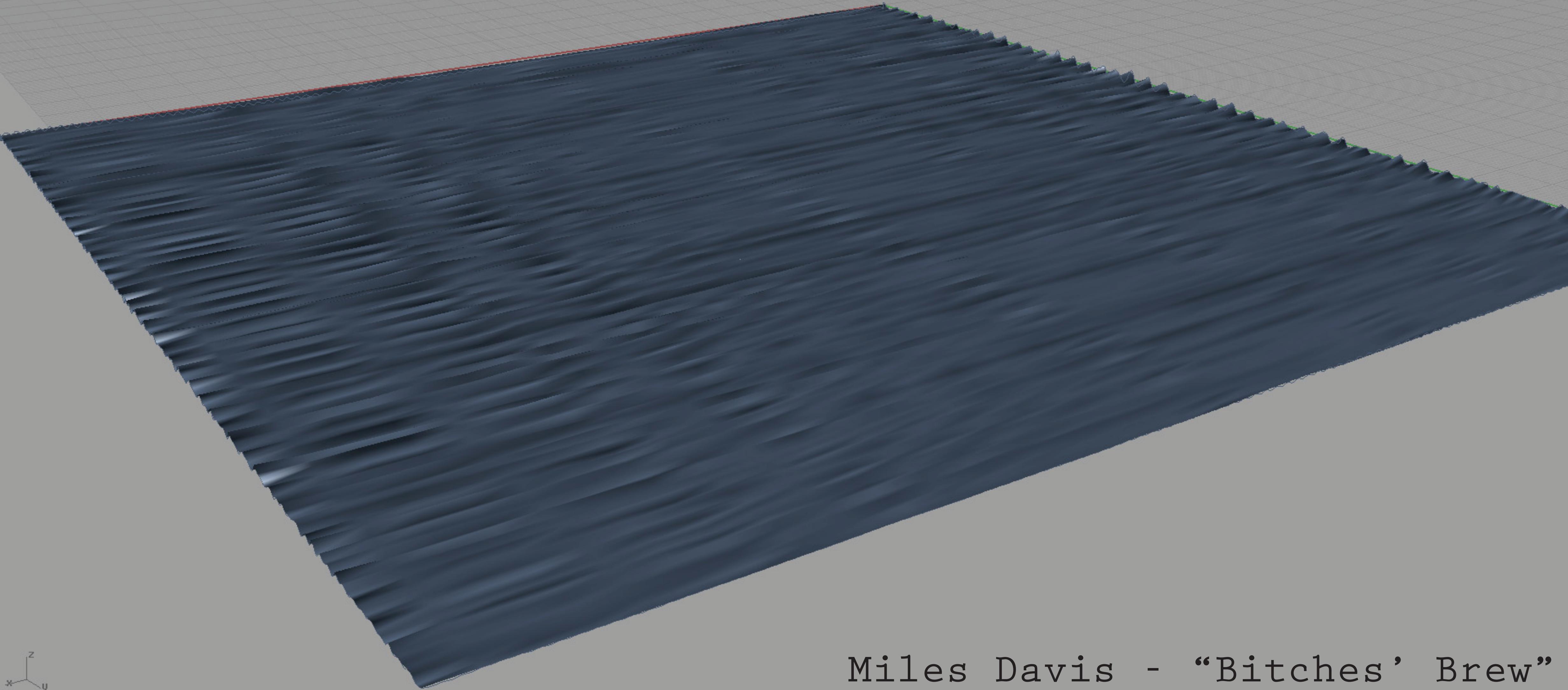
3. Miles Davis' trumpet from "Bitches' Brew"

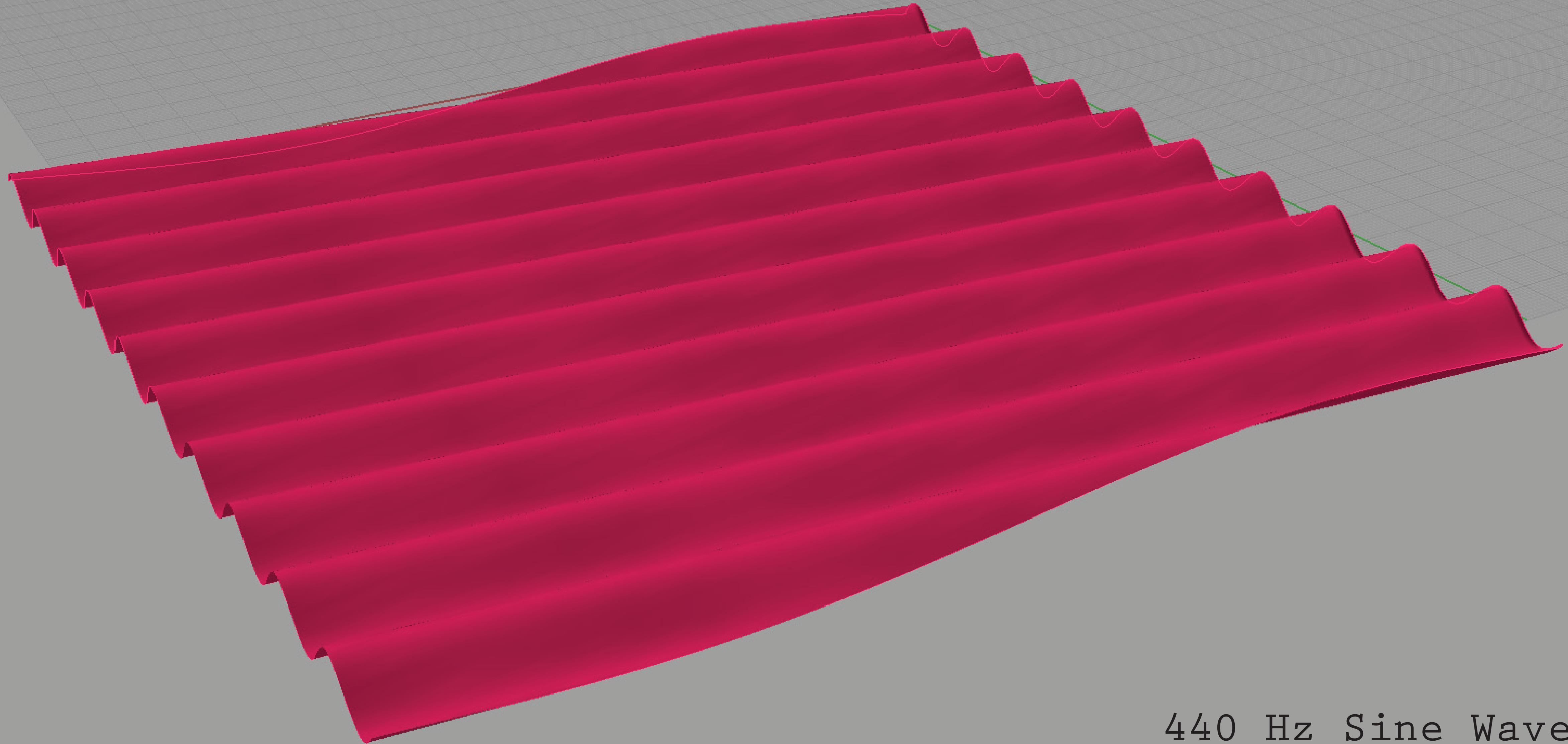
4. "Thunderstruck" from AC/DC live

I then wrote a java program to output these four songs as lists of amplitudes, values between -1 and 1, floated to 5 decimals.

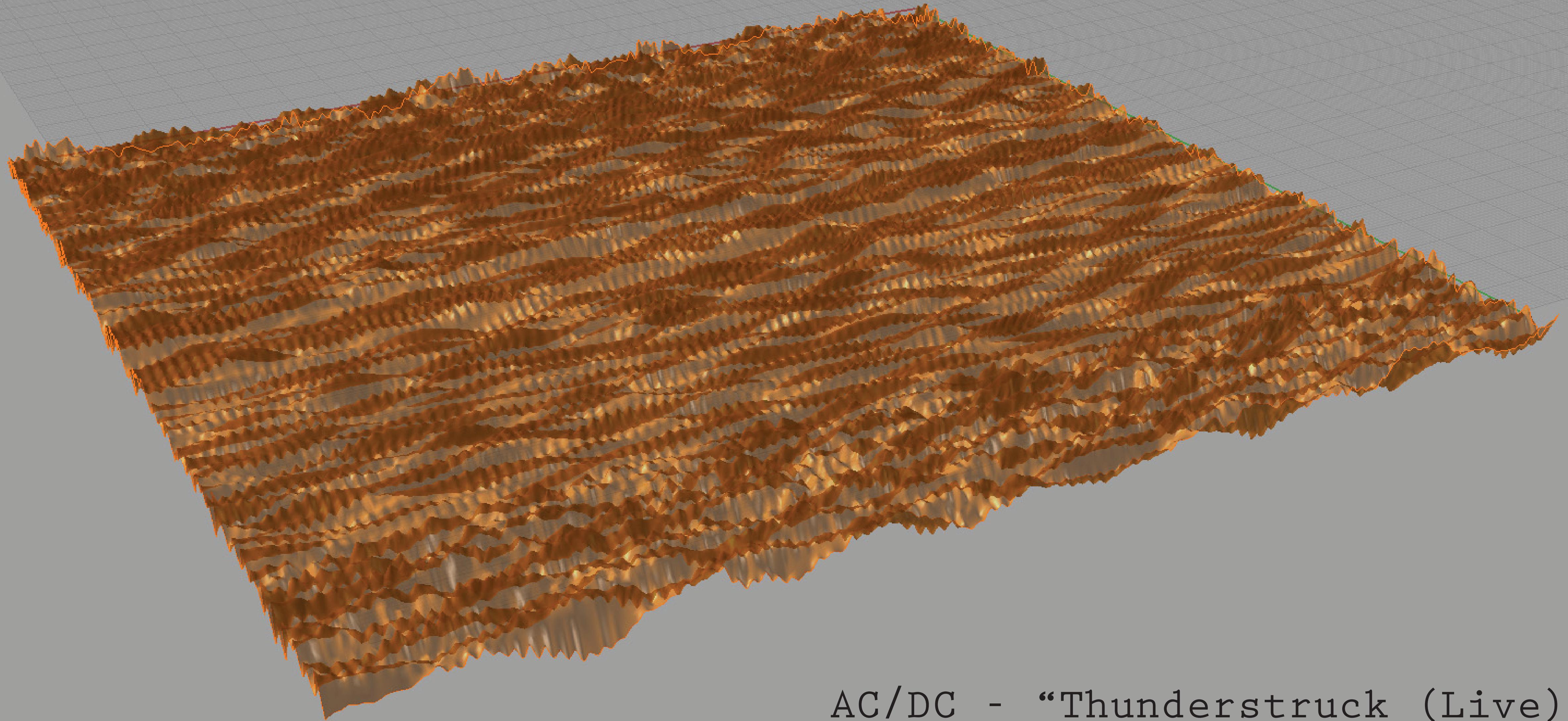


Static noise





440 Hz Sine Wave



AC/DC - "Thunderstruck (Live)"

Initially, I struggled with coming up with a more rounded 3D shape out of the sound I inputted. First, I tried making the surface into a paraboloid. However, I found that the shape of the paraboloid overtook the texture of the sound wave, and it mostly looked just like a paraboloid with weird texture.

Then, I zoomed in on the planar surface to look for moments that could give rise to better 3D shapes. Eventually, I realized that simply by multiplying the amplitude such that the surface took up more space in the z-direction, the surface itself had some cool shapes hiding in it.

I then resized the surface to sample only $30 \times 30 = 900$ samples, and tweaked the surface a bit such that it gained some hyperbolic characteristics. I was careful, though, not too overdo it with the hyperbolic qualities.

Then, I created a 2D cutout of this surface, using Grasshopper to help again with this.

Overall, I'm definitely happy with how it turned out. I think there's definitely a lot more I could do with this, and I believe it would be cool to do more with this later.

