

# WELCOME TO BLACK (W)HOLE

**Artists and scientists collaborated to create this immersive experience using actual scientific data about gravitational waves and black holes.**

As you approach the center of the room, you will see a swirling disc of light and color moving around what appears to be an empty space. This space is not empty; there is a black hole in the center. The material swirling around the black hole forms an accretion disc, which is made up of gases from stars that have been pulled apart by the black hole's gravity. Every black hole has an event horizon, which is the threshold beyond which nothing can escape, not even light. Eventually all the material in an accretion disc will be pulled across the event horizon and will no longer be visible.

Sometimes a smaller black hole will be pulled in by the gravity of a supermassive black hole. As you look at our supermassive black hole, wait for the smaller black hole that zooms into orbit. This is called an Extreme Mass Ratio Inspiral, or EMRI, because of the extreme difference in the masses of the two objects. As you watch the EMRI, listen to the sounds. That's what gravitational waves would sound like if we could hear them. Violent events in space – such as collisions or explosions – cause ripples in spacetime, like when you throw a stone into a pond. Those ripples are gravitational waves.

Einstein predicted the existence of gravitational waves 100 years ago, but we have only recently been able to detect them. In 2015, scientists in the Laser Interferometer Gravitational Wave Observatory (LIGO) collaboration first detected gravitational waves created by two black holes colliding. Einstein's work tells us that gravitational waves and black holes exist throughout the universe, and you can see some of his equations appearing and morphing on the wall. Watch as the equations fade into chalk dust and star fields.

This installation represents a merging of scientific data with artistic imagination. Einstein himself said, **“Imagination is more important than knowledge.”** So, as you take in the experience, be sure to let your imagination wander.