

Students invent 'Aura' musical instrument using gloves (w/ Video)

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Imagine holding music in your hands. That's what you can do with the Aura, a new electronic musical instrument conceived by Cornell University engineering students.

"The goal was to create the most intuitive instrument," said senior Ray Li, who came up with the idea of an instrument played by gesturing in the air and brought it to life in collaboration with programmer Michael Ndubuisi, also a senior.

To play the Aura, Li dons gloves fitted with sensors that report the position and orientation of his hands in a [magnetic field](#). Raising and lowering the hands controls pitch; spreading them apart increases volume. Closing the fingers activates flex sensors and muffles the sound, and twisting the hands adds distortion. Through an interface created by Ndubuisi, hand positions are converted to signals in the universal MIDI language for electronic instruments and fed to a synthesizer.

The result looks something like a person listening to music and pretending to conduct, but this "conductor" is more like a wizard conjuring music out of thin air. "We're trying to capture those intuitive gestures and make music," Li explained.

The [magnetic sensors](#) were lent by Ascension Technology Corp. of Vermont, which developed them for medical applications, motion tracking and manipulation of 3-D graphics.

Li's first electronic instrument, a class project for a circuits course in his sophomore year, was Sabre, an electronic cello in which conductive strips replaced strings, and a joystick in the right hand could modify the sound. Aura grew out of a desire to improve expressiveness. He wanted more than a joystick, he said, so he could directly control the sound with his hands.

The Cornell Council for the Arts is funding a public presentation at the end of this semester, for which

the team is developing the next phase, called SoundSpace. This will let the musician control recorded sounds of various instruments, add percussion through body movement, and provide some visual representations. The concert is slated for March 26 in Cornell's Barnes Hall Auditorium.

"The musician will create a whole song on stage with nothing," as Li describes it, adding that he will have to recruit a whole team of programmers to bring his vision to life.

Outside of class, Li plays "a bit of piano and guitar," but focuses on vocals, singing with the a cappella groups Tarana and Exploosh!

Provided by Cornell University

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