

Gamers feel the glove: Student team creates feedback device for the hand for virtual environments (w/ Video)

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Engineering student Kevin Gravesmill demonstrates the Hands Omni glove created at Rice University for virtual reality gaming systems at the annual Engineering Design Showcase. Credit: Jeff Fitlow

Rice University engineering students are working to make virtual reality a little more real with their invention of a glove that allows a user to feel what they're touching while gaming.

The Hands Omni glove developed at Rice's Oshman Engineering Design Kitchen will provide a way for gamers and others to feel the environments they inhabit through the likes of three-dimensional heads-ups displays.

The prototype glove introduced at the George R. Brown School of Engineering Design Showcase and developed with sponsor Virtuix, a Houston gaming technology company, is intended to provide force feedback to the fingertips as players touch, press or grip objects in the virtual world.

"What we've made is a glove that uses air to inflate bladders underneath your fingers, so you can hook this up to a video game and when you reach out and grab a virtual object, it feels like you're actually grabbing that object," said [mechanical engineering](#) student Thor Walker.

Other members of the team are mechanical engineering students Kevin Koch, Kevin Gravesmill and Yi Ji and electrical [engineering students](#) Marissa Garcia and Julia Kwok. All are seniors with the exception of Kwok, who is a junior. Their faculty advisers are Fathi Ghorbel, professor of mechanical engineering and bioengineering, and Marcia O'Malley, professor of mechanical engineering and computer science. The project won the "People's Choice" award at Rice's recent Engineering Design Showcase.

The glove (right-handed only at the moment) is designed to be as unobtrusive as possible, and is wireless to allow the player a full range of motion without having to worry about cables.

The fingers feel pressure from bladders in the glove's fingertips that expand and contract as necessary. The team's agreement with its sponsor means the glove's underlying technology must remain under wraps, but they say programmers should find it fairly simple to implement the glove's protocols into their games and other projects.

The fingers are individually addressable, though pressure on the ring and little fingers is triggered as one unit in the prototype. "It's not very often you pick something up with just your pinkie," Garcia said.

The entire glove weighs around 350 grams, light enough to keep the player from noticing it, even after a while. "We had our own constraints based on testing to determine the amount of perceptible weight that could be strapped to your fingers, arms, legs and limbs—the maximum weight that is perceptible to users—and we came up with 660 grams on the forearm and much less than that on the back of the hand or on the [fingers](#)," Koch said.

"We wanted as much mass as far back on the hand as possible, and that's exactly what we're doing," he said. "The user will hardly know it's there."

Provided by Rice University

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