

An invention allows violinists to experience the music in their bodies and transforms the instrument

Feeling the the

Photos by BRANDON SULLIVAN

Sound

or years, violinist Seth Thorn, a clinical assistant professor in the School of Arts, Media and Engineering, wanted to expand how people play, learn and perform on instruments. Two years ago, he invented a device called an active shoulder rest to transmit the feel of the violin's sound to a player's upper body. The revised version also includes small speakers.

"The speakers balance the sound," Thorn says. "You get the vibration on your shoulder. You get the actuation of the violin in the upper body and the diffusion of sound more spatially."



Feeling the sound coming out of the violin

The active shoulder rest easily integrates into current violin playing because most violinists already use a shoulder rest to ease neck strain. A key feature is that it works with a violin's traditional sound and strengths.

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Thorn's active shoulder rest serves as a silent metronome, allowing musicians experimenting with digital sound and people with sensory impairments or learning difficulties to entrain rhythm – in other words, to feel the music's beat.

It also helps students more fully fall in love with the violin. In addition to learning scales and practicing sheet music, some students use it to expand into playing something they've heard by ear or to improvise, Thorn says. "One of the students we worked with at Rosie's House, when she plucks the violin and feels the sound, her eyes are just like, 'Oh, my gosh!'" Thorn says.

Initially, Thorn made six active shoulder rests by hand with a colleague from the School of Arts, Media and Engineering. In 2022, he began sharing the active shoulder rests with Rosie's House, a free musical academy for children in Phoenix. With a \$10,000 seed grant from the Herberger Institute for Design and the Arts, the project is expanding and providing 3D-printed active shoulder rest devices, additional tools and music assistants from Thorn's classes to more Valley schools.

Creating something new

The newest version of the active shoulder rest adds speakers. The various components enable digital musicians to add loops and background rhythms and then play music over them. Thorn compares the latest version of the shoulder rest to a combination of a guitar pedal and haptic device.

This technology gives players numerous ways to experiment. Thorn offers this anecdote: When a teacher and a student began using it for the first time, one of Thorn's research assistants put on a repeating musical loop that the player both felt and heard through the violin.

"The student started. And I think the teacher was kind of sitting there, a little skeptical. Just like, what's going to happen now. And the student started improvising a melody on top of the loop," Thorn says. "And the The active violin rest uses haptics so the performer can experience the sound in their body.

Cross-team collabs and honors

- ASU Skysong Innovations helped Thorn patent the device's first version and the newest version. They advised on Thorn's startup, Matter Squared LLC.
- Thorn completed a National Science Foundation Innovation Corps training in February at ASU, where entrepreneurs teach innovators to create a business strategy. The Innovation Advancement Legal Clinic at the Sandra Day O'Connor College of Law, which pairs inventors with ASU law students, also accepted Thorn.
- Thorn collaborated with Jerry Gintz, associate teaching professor, and faculty associate Travis Kelley, who both teach in the School of Manufacturing Systems and Networks on the Mesa campus. Gintz's undergraduate class will prepare additive designs for manufacturing the shoulder rest version with Bluetooth speakers.
- In March, the Guthman Musical Instrument Competition at Georgia Tech, which identifies next-generation musical instruments, selected the active shoulder rest as one of nine international finalists.

teacher started crying because it's such an emotional thing in this classical music world to see that the student has another side, the ability to improvise."

Thorn explains that the traditional way of learning the violin is to rehearse, perform in a recital and repeat. The active shoulder rest offers more ways to learn and grow.

"We're bringing it to the ASU String Project next," Thorn says.

The mission of the ASU School of Music, Dance and Theatre String Project is to offer low-cost, high-quality instruction on orchestral stringed instruments.

The musical future

Soon, the newest version also will be Bluetooth-enabled, eliminating wires.

"The Bluetooth speaker will push the limits of the violin even more, creating a whole new instrument," Thorn says.

How else does it make a difference? For composing music and performing, he adds.

"I picture something like a whole orchestra of them. And you're adding a little magic and fairy dust, and people wonder, 'What is that?' I imagine the orchestra almost sparkling."

Watch a performance

See a performance by Seth Thorn at <u>youtube.com/</u> arizonastateuniversity