

## IU-based startup launches high-tech system for virtual, augmented reality developers

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The cy.PIPES system could help virtual reality/augmented reality developers synchronize tools that create environmental conditions like heat or wind. CyUtil LLC, a startup launched by Chauncey Frend of IU's Advanced Visualization Lab, is commercializing the system. Credit: Indiana University

A high-tech startup founded by an Indiana University information technology programmer/analyst allows developers to synchronize tools that provide immersive environmental conditions—like fans that create wind or lamps that create heat—with the visuals and sounds of their virtual reality or augmented reality system.

[CyUtil LLC](#) has launched a system called cy.PIPES, or Programmable Immersive Peripheral Environmental System. Chauncey Frend, the company's founder, is a programmer/analyst in IU's [Advanced Visualization Lab](#), part of the UITS Research Technologies division and the IU Pervasive Technologies Institute. He has been working on immersive environmental systems since he was an undergraduate student at IUPUI.

"I created cy.PIPES to easily plug-and-play the user's choice of 4-D effects devices along with the Unity game engine. Dynamic factors like wind direction are automatically computed with cy.PIPES, and effects are rendered to users as they would expect from the virtual environment they are immersed in," Frend said. "I wanted to prove it is possible to easily and inexpensively hook up environmental conditions to virtual and augmented reality systems."

Frend's research on cy.PIPES was published in a 2015 issue of the SPIE Electronic Imaging publication track. It was named Best Research Demonstration at IEEE VR 2016 and is being used by IUPUI informatics students and at the University of Louisiana at Lafayette.

Frend submitted an invention disclosure to the IU Innovation and Commercialization Office, which has applied for patent protection. He started CyUtil after he licensed the intellectual property from the IU ICO.

Frend has launched [an online funding campaign](#) for cy.PIPES. He said the company's next steps include reaching out to developers at creative studios to ask them to apply cy.PIPES to their content. The business model will include him listening to early adopters' reviews—regardless of their sector, industry or usage—and improving the tool.

"Virtual reality can be used for a variety of experiences like green energy training, alternative energy education, racing simulators, flight simulators, real estate tours, historic tours of ancient ruins and others," Frend said. "These experiences become more immersive by adding and synchronizing environmental conditions. Wind, heat, smells and tactile details can help developers make their world. The sky is the limit."

Provided by Indiana University

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