



# NEW HORIZON COLLEGE OF ENGINEERING



ADVANCED CONTEMPORARY AND  
EMERGING TECHNOLOGIES



DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

ACE Q2 DECEMBER 2015



## Magic Leap, Virtual Reality.

I'm sitting behind a workbench in a white-walled room in Dania Beach, Florida, in the office of a secretive start-up called Magic Leap. I'm staring wide-eyed through a pair of lenses attached to what looks like metal scaffolding that towers over my head and contains a bunch of electronics and lenses. It's an early prototype of the company's so-called cinematic--reality technology, which makes it possible for me to believe that the muscular beast with the gruff expression and two sets of swinging arms is actually in the room with me, hovering about seven feet in front of my face.

He's not just visible at a set distance. I'm holding a video-game controller that's connected to the demo station, and at the press of a button I can make the monster smaller or larger, move him right or left, bring him closer, or push him farther away.

Of course, I bring him as near as possible; I want to see how real he looks up close. Now he's about 30 inches from my eyeballs and, though I've made him pocket-sized, looks about as authentic as a monster could—he seems to have rough skin, muscular limbs, and deep-set beady eyes. I extend my hand to give him a base to walk on, and I swear I feel a tingling in my palm in expectation

of his little feet pressing into it. When, a split second later, my brain remembers that this is just an impressively convincing 3-D image displayed in the real space in front of me, all I can do is grin.

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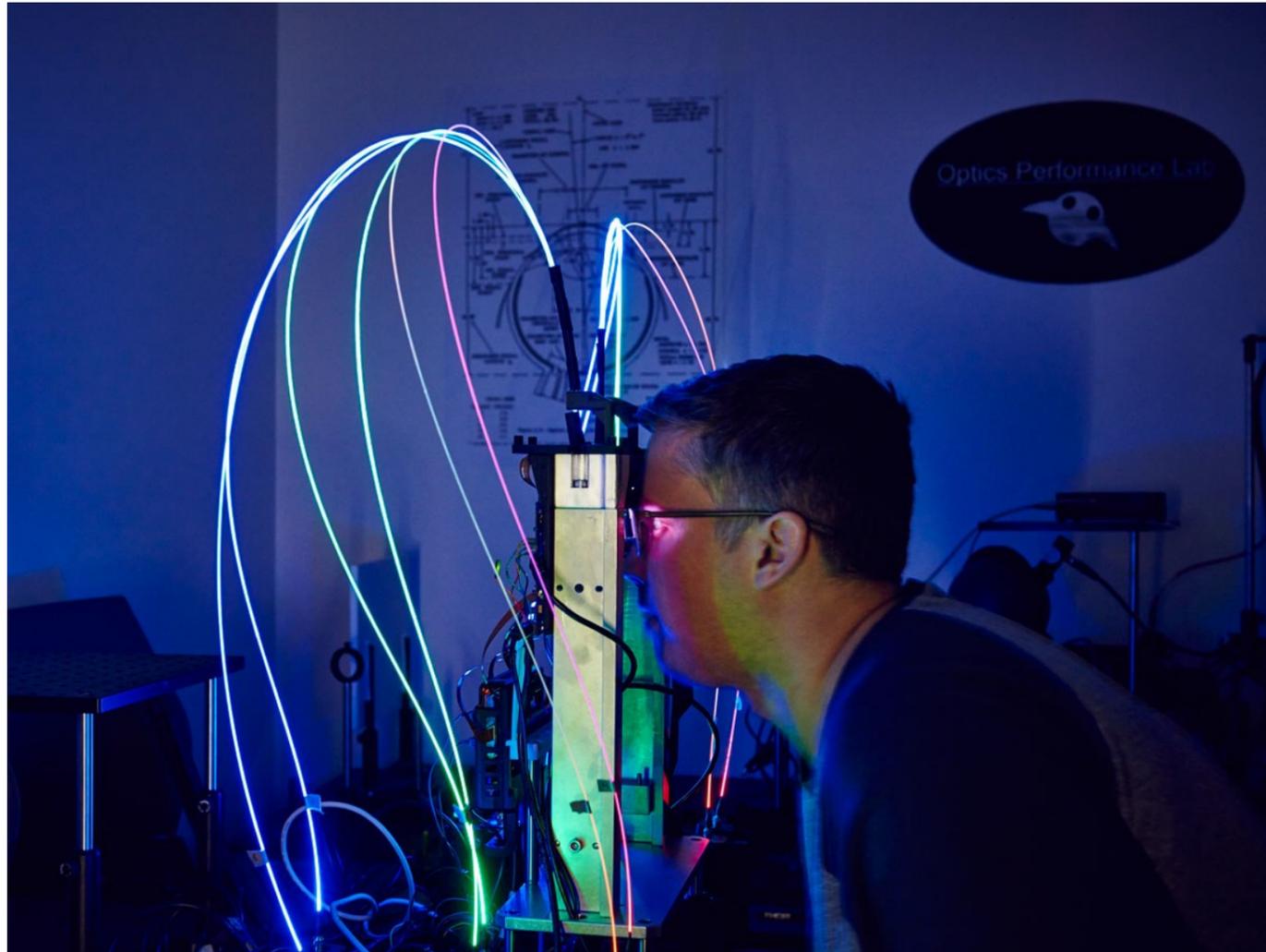
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“A start-up is betting more than half a billion dollars that it will dazzle you with its approach to creating 3D imagery.”

Virtual and augmented reality technologies used in movies, smartphone apps, and gadgets tend to under deliver on overhyped promises with images that look crappy. Typically, that's because stereoscopic 3-D, the most commonly used method, is essentially tricking your eyes instead of working with the way you normally see things. It produces a sense of depth by showing each eye a separate image of the same object at a different angle. But since that forces you to look simultaneously at a flat screen in the distance and images that appear to be moving in front of you, it can make you dizzy and lead to headaches and nausea.



When Apple Pay was announced in September, Osama Bedier was unimpressed. A long-time PayPal executive who now runs a payment start-up called Poynt, Bedier had spent more than two years leading Google's mobile wallet service, which lets people use their phones to pay for things at checkout counters. It used some of the same technologies as Apple Pay and failed to catch on widely. So despite Apple Pay's appealing promise—safe payment with just the press of a thumb on your iPhone—there was good reason to be sceptical of its chances, too.

Yet when Apple Pay launched just a few weeks later, Bedier was a convert.

Poynt makes a new kind of payment terminal—one that retailers can use to accept Apple Pay—and the advent of the service helped send the company's orders soaring. "Now merchants have people walking in saying, 'Why can't I use Apple Pay?'" he says at Poynt's Palo Alto headquarters, whose lobby displays a 100-year-old National cash register, testament to the long history of payment technologies. Originally Bedier expected Poynt to sell 20,000 payment terminals in 2015, but after the launch of Apple Pay, he scrambled to find a new manufacturer in Taiwan that could handle far greater demand. "Apple Pay will touch off a rush to mobile payment," he says. Momentum for mobile payment technologies was building even before Apple Pay debuted last fall.

Some 17 percent of all smartphone users reported making a point-of-sale payment with their phone in 2013, up from 6 percent in 2012, according to a U.S. Federal Reserve survey. In-person mobile payments in the United States more than doubled in 2014, to \$3.7 billion, according to Forrester Research. Meanwhile, as services such as Uber and stores like Starbucks allow people to pay via mobile app, transactions that once brought out the wallet are disappearing into the phone, where they are faster and should be more secure. You can use your existing credit card accounts, but you never have to pull out the physical cards. "We know after people tap their phone to pay two or three times, they don't go back to their old behaviour," says Ed McLaughlin, MasterCard's executive in charge of new payment technologies.

"A clever combination of technologies makes it faster and more secure to buy things with a wave of your phone."