

The Virtual Reality Renaissance Is Here, But Are We Ready?

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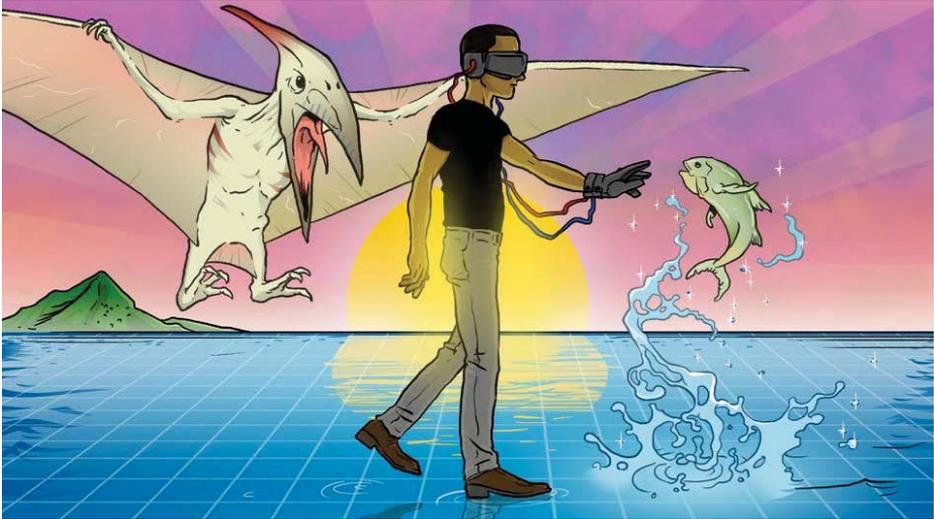


IMAGE: MASHABLE, BOB AL-GREENE

BY LANCE ULANOFF / 2014-04-20 21:19:32 UTC

MashableSpotlight

This piece is part of Mashable Spotlight, which presents in-depth looks at the people, concepts and issues shaping our digital world.

I'm flapping my wings. Not hard, but slowly and smoothly. At 25 feet across, my wingspan is so great I don't need to exert much energy to achieve lift. In the distance, I see an island under an azure sky. This is my home. Off to my west, the sun is setting and the sky glows with warm, orange light.

Spotting movement in the ocean below, I bend my body slightly to the left and begin a gentle dive. As I approach the shore, I spot my prey splashing in the shallows. I lean back, keeping my wings fully extended so I can glide just above the water. I'm right over the fish. I pull in my wings, bend forward sharply and dive into the water. I emerge with a fish in my mouth. Success.

Better yet, I did all this without ever leaving the ground or getting wet.



Lance Ulanoff trying out the American Museum of Natural History's Pterosaur flight simulator.

IMAGE: MASHABLE

This is virtual reality, or at least the American Museum of Natural History's (AMNH) brand of semi-immersive virtual reality. With a large projection screen, [Microsoft Kinect V1](#) and a gaming PC, the setup lets you control the

flight of a virtual pterosaur by standing in front of the Kinect sensor, flapping your arms and bending.

Though I wore no head-mounted display or earphones, the large screen and responsive, stutter-free motion achieved a remarkably immersive effect. As I stood in the darkened room on the fourth floor of the museum, surrounded by the exhibit's curators, developers and swarms of schoolchildren, I found myself experiencing that "floating head" feeling one sometimes gets from virtual reality.

"It's very peaceful to fly in it," AMNH Director of Exhibition Interactive and Media H el ene Alonso told me. "You sort of lose yourself in it. You forget about yourself."

If a non-profit like AMNH could afford the requisite hardware and expertise to create this experience, could virtual reality for the masses be far off?

When done right, VR is that compelling, but it remains a rather esoteric beast, one that engenders visions of *Star Trek Holodecks* and ridiculous, oversized helmets. Neither is the case, but they help explain virtual reality's long and somewhat complicated history and how, finally, thanks to new, practical applications, improved convenience and computing power, and plummeting technology costs, it's on the precipice of a new era. Widespread consumer acceptance and adoption could be just around the virtual corner.

The most recent indication of VR's potential mainstream viability is [Facebook's purchase of gaming headset Oculus Rift](#) in March. But is that an accurate sign of VR's return or simply an exaggerated uproar because it's Facebook? Even advanced devices like Oculus don't beget applications far beyond gaming — yet. The average consumer still can't picture what the practical applications could be, or even whether we need them at all.

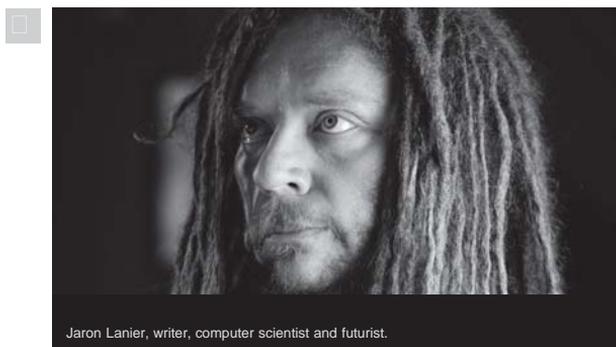


IMAGE: JONATHAN SPRAGUE

When scientist and futurist Jaron Lanier cooked up the term "virtual reality" in the 1980s, it was little more than a marketing device. It explained the new virtualization and simulation system he and his team at VPL Research built to help them develop a new programming language.

The head-mounted display (HMD) and glove for manipulation became something of a sensation. "All of a sudden we had a company," Lanier told *Wired* in 1993. "And potential investors would come around and I would show them this thing, and I'd say, 'Now look at this neat language.' And they'd say, 'Language! You're using a glove! My God!' So suddenly the whole focus shifted."

Lanier soon graced the covers of the *New York Times* and *Wall Street Journal*. It was the first VR boom.

"We were in our early 20s," Lanier, now 53, recalled. "I thought we were doing the most important thing humanity had ever encountered." The excitement surrounding this new frontier in human interaction and engagement was palpable.

"There was reason to believe," said Harold Rheingold, who wrote 1991 book [Virtual Reality](#), "that any applications that let people interact with computers or simulations would be very big."

Lanier and VPL did spark a revolution. Virtual reality's impact is evident in everything from the AMNH exhibit to automobile design ([Ford's Immersive Vehicle Environment](#) is particularly impressive), [surgical simulations](#) and CNN's guesses at what happened to Malaysian Flight MH370.

Consumer VR, however, never quite achieved liftoff.



Two people demonstrate the EyePhone system which uses special goggles and a DataGlove®, which allows them to see and move objects around in a computer created environment. The EyePhone, developed by VPL Research, is on display at the Texpo Telecommunications Show held in San Francisco June 7, 1989.

IMAGE: JEFF REINKING/ASSOCIATED PRESS

Mattel bought VPL's glove and turned it into the Power Glove, and by the mid-1990s, more than two dozen companies were building consumer-level hardware and software. Most of it worked with your garden-variety PC. The technology, however, had an Erector-Set feel to it — almost none was plug-and-play. Virtual environment-building software, like Virtus VR and Superscape VRT, was complex and expensive (Superscape cost nearly \$4,000). Controllers, like InWorld's VR CyberWand, required users to install a special card in their computers. And the HMDs, like Forte Technologies' VFX1 HMS, which were based on stereoscopic 3D technologies, were often bulky, uncomfortable and expensive (\$995).



A spread from PC Magazine's March 13, 1995 feature story on Virtual Reality.

IMAGE: SCREEN GRAB / ZIFF DAVIS MEDIA

All this high-end hardware was plugged into 486 MHz computers that struggled to deliver believable 3D imagery. Worse yet, 1990s-era VR used external infrared receivers dotted around the room. Accurate and real-time are not exactly spot-on descriptions.

"Even the slightest detectable lag [in VR] and some people get simulator sickness," said Rheingold.

He wasn't convinced — even in 1991 — that consumers would want to wear a head-mounted device at all.

By the late 1990s, the hype surrounding consumer VR had all but fizzled out. For a time, it seemed as if consumer-level virtual reality would remain primarily the stuff of movies, comic books and TV.

It would take decades and a lot of new technology for that to change.

Computer processing power, perhaps the chief engine behind believable VR, doubled many times over since the 1990s. Quad- and dual-core 1.5 GHz CPUs in smartphones are now commonplace. Tablets can power 4K video. Sub \$50, highly accurate sensors are available in most tablets and smartphones, and you can easily add them to other devices.

These changes not only made the post-PC era possible, they rebooted the consumer VR era.

But all that technology without activity and inspiration is like a full chessboard without players. Despite the existence of VR-ready consumer-level technology, no one was rushing to build VR for the home. So outside the industry, where was VR thriving?

In the lab.

Stanford University's Virtual Human Interaction Lab, which recently enjoyed a [visit from Facebook founder](#) and CEO Mark Zuckerberg, offers visitors a series of virtual reality experiments.

Jeremy Bailenson, Ph.D., founding director of Stanford's [Virtual Human Interaction Lab](#), said these experiments show participants a different life or experience. Visitors don a bulky, head-mounted display and hold a pair of sensors. In-room sensors track their movements while the HMD projects a new reality Bailenson's team designed.



One particularly impactful experiment is called "The Pit." The premise is simple: You're in a virtual room when, suddenly, the floor drops away, revealing a 30-foot-deep cavern. All that remains beneath your feet is a narrow plank. It's disorientating, but recent advances in sensor technology have upped the ante.

Bailenson has been doing this for 20 years. "In the last year or two," he explained, "we've gotten to the next level."



Until recently, there was no direct pathway for VR between lab innovation and consumers' homes. While the enterprise industry continues to use the technology to build cars, perform brain surgery and virtually land troubled planes, consumers aren't marching into Best Buy demanding their VR setups.

So what will it take for mainstream consumers to embrace the traditionally cumbersome technology?

As with any emerging technology, consumers are only interested in VR as so far as it measurably improves their lives (or enjoyment of their lives) and is easy and affordable.

Bailenson's lab still uses expensive, somewhat proprietary technology largely devoted to psychological experiments: what it feels like to be a different race or gender, for example. He's especially interested in how VR experiences can change attitudes and ideas. One of his VR experiments lets you virtually chop down a giant sequoia, which Bailenson hopes people will remember when they run out to buy another ream of paper.



CNN's Morgan Spurlock tries out Stanford VR Lab's simulation gear.

IMAGE: CNN MORGAN SPURLOCK INSIDE MAN

Even though Bailenson is still looking more at the implications of VR as opposed to real-world applications, he can imagine VR in five years transforming “the nature of what it means to travel, education, really redefining what it means to be in a place.”

Imagine a science course where you learn about molecules from inside a cell, or a Civil War history lecture conducted at Fort Sumner as soldiers fight around you, Bailenson said. Perhaps you'd like to take a trip to Yosemite Park, without the tolls, fuel expenses or inconvenience of even leaving your home.

He insists the potential is vast.

But Lanier imagines a less prosaic future for VR.

“I think what [virtual reality] is really going to be about is not so much the reality of the world,” Lanier said. “It's going to be about turning into different creatures, changing the way we operate cognitively in relationship to the world. I think we're going to unlock cognitive potential in people.”

Rheingold, the *Virtual Reality* author, sees an obvious market for virtual reality but worries it could be limited to gaming. “It's a no-brainer to predict that there will be a market for gamers, but what else? As a scientific visualization instrument or architectural tool? It's just not as large a market as, say, the Xbox is.”

He hastened to add that this “doesn't mean it's insignificant.”

Facebook's recent acquisition of Oculus may point in an entirely different direction. Will the company build a space where people can don their Oculus Rift headgear and interact with each other more intimately?

After all, social media and virtual reality aren't strangers. *Second Life*, while not immersive, offers a virtual world where you move via keyboard and mouse.

However, Lanier is fixated with the data and privacy implications of a VR tool in Zuckerberg's hands. He posits these concerns in his new book, *Who Owns the Future*. There's an obvious concern when you mix the immersive power of virtual reality with a platform designed to ingest every personal detail about you, ostensibly in an effort to quantify you and connect you with friends, family, like-minded people, content, entertainment and commerce.

A Facebook VR system would track not only what you click and type (though Facebook's data is always anonymized and not always collected), but also at what you point toward, touch, reach for, look at, walk around, how fast you turn your head and so on.

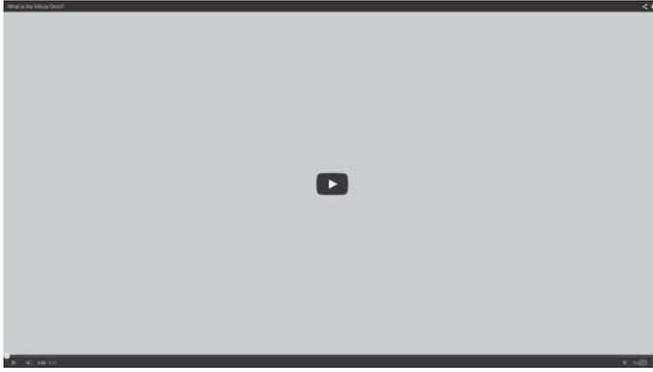
There is, Lanier said, “a lot of potential for creepiness.”

How you feel about what virtual reality can do or for you is less important, in the short term, than getting the technology into the hands of regular people. To do that, the technology has to become cheaper and easier to use.

The convenience-to-cost ratio is a key factor in bringing effective VR to the masses. It certainly accounts for the uptick in new products like Oculus, Sony Morpheus, Sixsense and Virtuix Omni.

The Omni “[natural motion interface](#)” device is actually a mashup of the increasingly popular Oculus Rift and a special treadmill and harness. It lets you turn around and run in place while wearing the Oculus HMD. NBC's *Shark Tank* featured the device last year. Mark Cuban and the other potential investors seemed impressed with the technology, but none bit. CEO Jan

Goetgeluk told [Road to VR](#) that the sharks' criticisms — that it was too big and gamers were “too lazy” — were off the mark.



At roughly \$1,000, the Omni treadmill still exceeds what people are willing to pay for immersive VR. What consumers appear to want is off-the-shelf VR technology for \$200 or less.

Case in point: Microsoft's 3D-imaging system, Kinect, which was introduced in 2010, may have done more than any other product to introduce virtual reality experiences to the masses.

That first version powers the American Museum of Natural History's pterosaur VR experience. (The second, more precise Kinect for Xbox One arrived too late in AMNH's development timeline.)

Lanier is one of the key minds behind Kinect. He calls the motion and depth detection device, which he developed with [Alex Kipman](#), a “virtual reality breakthrough.”

“Kinect performed better than anything similar at any price — not the depth camera, per se, but the derivation of human motion,” he said.

Kinect's ability to see a room and everything in it is transforming gaming and VR experiences alike, and may have helped open the door for more immersive experiences like Oculus Rift.



A group of exhibitors and showgoers demonstrate the virtual reality Vfx1 Headgear made by Forte Technologies, Inc. of Rochester, N.Y., during Comdex/Fall'95 Wednesday, Nov. 15, 1995, at the Sands Convention Center in Las Vegas. The headgear, according to the company, “jolts your senses with immersive 3D stereoscopic imaging, full-motion tracking, AKG stereo sound, amazing large-screen images and other mind-blowing features.”

IMAGE: LENNOX MCLENDON/ASSOCIATED PRESS

The virtual reality landscape is littered with the corpses of failed hardware. “Every major tech company has tried more than once over the years, without exception [to build HMDs],” Lanier told me, laughing. In the end, they couldn't match quality with costs.

“HMDs, up until last year, have remained just as expensive and have not gotten much better,” Bailenson said.

That equation, though, is changing.

Most experts I spoke to agree that, finally, the technology is becoming affordable for manufacturers and consumers.

In reality, VR innovation — at any level — is simply a benefactor of a core technology principle: Moore's Law. The law states that the power of transistors doubles every 24 months. It also applies, Lanier said, to technology costs. They're on an inverse and more accelerated path. What we see now in terms of power, potential and cost is nothing like what we'll experience five, 10, 15 years from now.

The Oculus Rift Development Kit 2 costs \$350; the original Kinect costs \$150. We don't know the cost of Sony's Project Morpheus yet, but expect it to be under \$400. Computers tens of thousands of times more powerful than what virtual reality pioneers used in the '80s and '90s now cost a few hundred dollars. An Arduino accelerometer sensor costs under \$30. Augmented reality is possible through your \$199 smartphone.

With decades in the VR business, Amir Rubin, cofounder and CEO of Sixsense, says it's "thanks to kids like Palmer who broke the mold and said, 'I don't care what people say, I'll build it for myself,' and then he built it for a \$300 price point."

Rubin may be a little biased. Sixsense makes the STEM System, which is a wireless control system of sensors that precisely track your body's position and movement. Used in tandem with Oculus, it can add 3D hands to your VR environment that perfectly mimic your real-world movements. For now, the system, which offers two controllers for \$300, is mostly for developers. But Rubin desperately wants to bring it to consumers.

He's not surprised the stars are finally aligning for Consumer VR 2.0. "I was sure that ... every school was going to have VR, every training would have VR, rehabilitation would have VR. I was wrong then. I'm definitely hoping that, this time, I'm not wrong."

As good as today's virtual reality experiences are — in exhibition and in the home — they owe much to our recent consumer technology past.

What we see today in VR is still very much an extension of the gaming community. "It reminds me a bit about how new media always start out mimicking old media," Lanier said. The first moving pictures looked like stage plays.



A young student gives the American Museum of Natural History Pterosaur flight simulator a test run.

IMAGE: MASHABLE / LANCE ULANOFF