A decade after Theranos imploded, here's what scientists want you to know

A viral documentary has everyone talking about Elizabeth Holmes's fraudulent blood testing start-up again—but scientists never stopped

Around a decade ago Theranos, one of the buzziest science start-ups ever, imploded. Swamped by allegations of fraud, the actions of the company and its enigmatic CEO, Elizabeth Holmes, shone a harsh light on problems with scientific start-ups. Now scientists say these issues have only gotten worse.

In a new documentary entitled *You Can See Everything,* filmmaker Nathan Fielder follows Holmes in the lead-up to starting a prison sentence in May 2023, after she was found guilty of fraud.

The film retraces the saga of Theranos, which claimed to have a machine that could perform hundreds of clinical tests using a single drop of blood. After years of fundraising, high-publicity support and partnerships with pharmacies to make the tests accessible, scientists and journalists revealed in 2015 that Theranos's claims were false: there was no scientific evidence that its product worked.

Theranos is, in many ways, a cautionary tale and a relic of 2010s Silicon Valley. But for scientists, Theranos's problems are anything but history.

Canaries in the Coal Mine.

John Ioannidis is a professor at Stanford University's medical school and was among the first to question Theranos's bona fides in a 2015 article. Eleven

years later Ioannidis says he worries the problems of transparency and a lack of strong evidence in science and technology start-ups are, if anything, worse today.

“I feel kind of uneasy about this being presented as a sensationalist, movie-quality story [about] a single bad apple because I see very similar phenotypes to Theranos,” Ioannidis says.

Ioannidis argues that, in some ways, claims of scientific progress are a public relations game. As private companies have become increasingly powerful agents in driving research forward, the trend has shifted fields away from more traditional, publicly funded research and academia.

“Holmes is in jail, but the recipe of her success has been even more widely adopted,” he says.

Ian Papautsky, a microfluidics researcher at the University of Illinois Chicago, says that Theranos’s public downfall and time in the spotlight create a strong case for validating scientific findings. But he, too, worries that, as start-ups and private companies increasingly drive discovery, opportunities for secrecy or fraud may grow.

“Many of the start-ups are not transparent in their technology development,” he says. “On the one hand, you would argue that they have to be, because they’re trying to compete with everyone else. But that also makes it a lot easier to hide the mismanagement and all these other various issues.”

Holmes’s husband, Billy Evans, who also appears in the documentary, is himself quietly building a new blood testing company. The start-up, called Haemanthus, plans to use artificial intelligence tools to run diagnostic tests. Holmes is listed as a scientific adviser to the company, and Evans has raised millions of dollars in funding, according to NPR.

“The idea is to put the band back together and do it all again,” Evans tells Fielder in the movie.

A Lasting Effect.

Theranos has made it harder for academics who study blood testing or microfluidics to get funding, says Umut Gurkan, a biotechnology researcher at Case Western Reserve University. He creates blood testing products for conditions such as sickle cell anemia. Gurkan remembers going to Silicon Valley in 2015 to seek funding and being told, “We don’t invest in diagnostics anymore.”

Even as diagnostic technology has advanced, it remains difficult to bring it into markets, he says.

“Trust in science is fragile, and ‘a drop of blood’ now sounds like a scam,” Gurkan says. “Honest companies trying to save lives pay that tax. And at the end of the day, patients and real people pay the price with lack of working diagnostics and technologies that deserve to be in the market.”

As for Theranos’s claims: even after more than 10 years of advancement in clinical testing and microfluidics, its premise remains impossible, the researchers consulted for this article say—at least at the scale that Holmes promised. A drop of blood doesn’t hold nearly enough biological information to conduct the hundreds of tests that Theranos claimed.

Theranos’s mission was noble, Papautsky says, but the science did not and does not hold up.

“Doing multiplex testing on a small volume of blood is a good concept—it would be an important advancement in technology,” he says. “But having experts with the right knowledge and good management is very important, and it’s becoming more and more important these days. Expertise is not necessarily being valued as it used to be.”

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