U.S. courts will ultimately reach the same conclusion." (Huawei did not respond to *Nature*'s request for comment.)

Huawei reported spending 90 billion yuan (US$13.3 billion) on research and development in 2017, including through partnerships with dozens of universities across the world (see 'Huawei-funded research').

In a letter to senior staff on 30 January, seen by *Nature*, Berkeley's vice-chancellor for research, Randy Katz, said that, effective immediately, the university would not enter into or discuss new research collaborations with Huawei, or seek or accept new research gifts from the firm, pending a ruling on the charges.

"UC Berkeley holds its research partners to the highest possible standards of corporate conduct, and the severity of these accusations raises questions and concerns that only our judicial system can address," Katz said in the letter.

Huawei and a US subsidiary, FutureWei, contribute to five research programmes, amounting to about $7.8 million in funding over the past 2 years, says a spokesperson for the university. The moratorium does not apply to existing agreements for research already under way, Katz wrote.

The university says that none of the work involves sensitive technological secrets or knowledge, and that it does not grant the firm unique or exclusive rights to intellectual property from the research. As with all research at the university since the 1930s, the results are shared openly, adds the spokesperson.

The University of Texas at Austin — where Huawei has supported several research projects — says that it already treats Huawei as a 'sensitive entity'. The label means that the firm poses elevated information-security and export risks, and special guidelines govern researchers' interactions with the company.

A spokesperson for the University of Texas at Austin says that it will decide on how to move forward as quickly as possible ■

TECHNOLOGY

The 'replicator' prints 3D objects from scratch

Printer creates whole structures all at once by projecting light into a resin that solidifies.

BY DAVIDE CASTELVECCHI

They nicknamed it the 'replicator' — in homage to machines in the Star Trek saga that can make nearly any inanimate object materialize.

Researchers in California have unveiled a 3D printer that creates an entire object in one go, rather than building it layer by layer as typical additive-manufacturing devices do — bringing science fiction a step closer to reality. "This is an exciting advancement to rapidly prototype fairly small and transparent parts," says Joseph DeSimone, a chemist at the University of North Carolina at Chapel Hill.

The device, described on 31 January in *Science*, works like a computed tomography (CT) scan in reverse, explains Hayden Taylor, an electrical engineer at the University of California, Berkeley, who was part of the team that devised the replicator. In CT machines, an X-ray tube rotates around the patient, taking multiple images of the body's innards. Then, a computer uses the projections to reconstruct a 3D picture.

The team realized that this process could be reversed: given a computer model of a 3D object, the researchers calculated what the structure would look like from many different angles, and then fed the resulting 2D images into an ordinary slide projector. The projector cast the images into a cylindrical container filled with liquid acrylate, a type of synthetic resin (B. E. Kelly *et al. Science* http://doi.org/cz8v; 2019).

As the projector cycles through the images, which cover all 360 degrees, the container rotates by a corresponding angle. "As the volume rotates, the amount of light received by any point can be independently controlled," says Taylor. "Where the total amount exceeds a certain value, the liquid will become solid."

STEPHEN MCNALLY, UC BERKELEY

Think you know 3D printing? Think again.

This is because a chemical in the resin absorbs photons and, once it reaches a certain threshold, the acrylate undergoes polymerization — the resin molecules link together into chains to make a solid plastic.

The exposure process takes about two minutes for an object a few centimetres across. The remaining liquid is then removed, leaving behind the solid 3D object. The team recreated a version of Auguste Rodin's sculpture *The Thinker* a few centimetres tall.

The process is more flexible than conventional 3D printing, Taylor says; for example, it can create objects that enclose existing ones. The resulting structures also have smoother surfaces than can be achieved with typical 3D printers, which could be helpful for manufacturing optical components. The scientists suggest that the method could be used for printing medical components. ■