

## Mini robot fish swim in schools, just like the real thing

Inspired by how schools of fish intuitively synchronize their movements, Harvard scientists have engineered miniature underwater robots capable of forming autonomous swarms. Each robotic fish, known as a “Bluebot,” is equipped with cameras and blue LED lights that sense the direction and distance of others inside water tanks. They swim using flapping fins rather than propellers, which improves their efficiency and maneuverability compared to standard underwater drones.

“It’s definitely useful for future applications—for example a search mission in the open ocean where you want to find people in distress and rescue them quickly,” said Florian Berlinger, the lead author of a paper about the research that appeared in *Science Robotics* on Wednesday. Other applications could include environmental monitoring or inspecting infrastructure. Existing underwater multi robot systems rely on individual robots communicating with each other over radio and transmitting their GPS positions.

The new system moves closer to mimicking the natural behavior of fish, which show complex, coordinated behavior without following a leader. The 3D printed robots are about 10 centimeters (4 inches) long, and their design was partly inspired by Blue tang fish that are native



This handout photo shows a lit Bluefish.

to the coral reefs of the Indo-Pacific. The robots use their camera “eyes” to detect other robots in their peripheral vision, then engage in self-organizing behavior, which include flashing their lights simultaneously, arranging themselves in a circle, and gathering around a target. Berlinger described a test in which the robots were spread out across a water tank to seek out a light source.

When one of the robots found the light, it sent out a signal to the others to gather around, in a demonstration of a search-and-rescue mis-



This handout photo shows a Blueswarm intermingling with real fish.— AFP photos

sion. “Other researchers have reached out to me already to use my Bluebots as fish surrogates for biological studies on fish swimming and schooling,” said Berlinger, explaining that the robot collectives can help us learn more about collec-

tive intelligence in nature. He hopes to improve the design so that it doesn’t require LEDs and can be used outside laboratory settings such as in coral reefs.—AFP

## World’s oldest known cave painting found in Indonesia

Archaeologists have discovered the world’s oldest known cave painting: a life-sized picture of a wild pig that was made at least 45,500 years ago in Indonesia. The finding described in the journal *Science Advances* on Wednesday provides the earliest evidence of human settlement of the region. Co-author Maxime Aubert of Australia’s Griffith University told AFP it was found on the island of Sulawesi in 2017 by doctoral student Basran Burhan, as part of surveys the team was carrying out with Indonesian authorities.

The Leang Tedongnge cave is located in a remote valley enclosed by sheer limestone cliffs, about an hour’s walk from the nearest road. It is only accessible during the dry season because of flooding during the wet season—and members of the isolated Bugis community told the team it had never before been seen by Westerners. Measuring 136 by 54 centimeters (53 by 21 inches) the Sulawesi warty pig was painted using dark red ochre pigment and has a short crest of upright hair, as well as a pair of horn-like facial warts characteristic of adult males of the species.

There are two hand prints above the pig’s hindquarters, and it appears to be facing two other pigs that are only partially preserved, as part of a narrative scene. “The pig appears to be observing a fight or social interaction between two other warty pigs,” said co-author Adam Brumm. Humans have hunted Sulawesi warty pigs for tens of thousands of years, and they are a key feature of the region’s prehistoric artwork, particularly during the Ice Age.

### Early human migration

Aubert, a dating specialist, identified a calcite deposit that had formed on top of the painting, then used Uranium-series isotope dating to confidently say the deposit was 45,500 years old. This makes the painting at least that age, “but it could be much older because the dating that we’re using only dates the calcite on top of it,” he explained.



This undated handout photo shows a dated pig painting at Leang Tedongnge in Sulawesi, Indonesia. — AFP

“The people who made it were fully modern, they were just like us, they had all of the capacity and the tools to do any painting that they liked,” he added. The previously oldest dated rock art painting was found by the same team in Sulawesi. It depicted a group of part-human, part-animal figures hunting mammals, and was found to be at least 43,900 years old.

Cave paintings such as these also help fill in gaps about our understanding of early human migrations. It’s known that people reached Australia 65,000 years ago, but they would probably have had to cross the islands of Indonesia, known as “Wallacea.” This site now represents the oldest evidence of humans in Wallacea, but it’s hoped further research will help show people were in the region much earlier, which would resolve the Australia settlement puzzle. The team believes the artwork was made by Homo sapiens, as opposed to now extinct human species like Denisovans, but cannot say this for certain. To make handprints, the artists would have had to place their hands on a surface then spit pigment over it, and the team are hoping to try to extract DNA samples from residual saliva. — AFP

## Don’t pimp my ride: Afghanistan retires ‘39’ number plates

Afghan traffic authorities are retiring license plates containing the number “39” because the figure has long been associated with pimping and prostitution. Vice President Amrullah Saleh said a decree to that effect would be introduced this week, eliminating what had become a tempting source of bribery by traffic officials. “The number (39) will be removed from the traffic system. It is said that people pay \$300 bribes to avoid the number,” he said in a Facebook post. The origin of 39’s street meaning is lost in time, but said to be linked to a notorious pimp in the western city of Herat, whose car registration plate contained the number.

Now, anyone driving a car sporting the figure risks being linked to an underground sex industry that is taboo in the devoutly Muslim nation. New car owners have resorted to paying bribes to avoid being issued license plates with the digits. “At the traffic department they ask you if you want number 39 or not,” said Hakim, a car dealer in the capital. “If you don’t, then they ask for a bribe.” He said nobody would buy a second-hand car with the digits because they consider it “shameful”.

“Last year, I had to sell two cars at almost half the price because they had 39 in their number plates,” Hakim told AFP. The association has even spread beyond vehicles, and Afghans can be teased or shunned for having telephone numbers or addresses featuring the digits.— AFP