Chinese scientists build soft robotic fish

Chinese scientists from eastern China's Zhejiang Province have created a soft robotic fish with no motor and a fast speed.

"The robot is expected to be used underwater to record the temperature and salinity of the sea and detect pollutants," said Li Tiefeng, an associate professor at Zhejiang University.

The 9.3-centimeter-long fish weighs 90 grams and has an electric controller at the core, fins made of silicone, and a silicone body and tail. All components are transparent except for a small battery pack and two electromagnets.

"The soft and transparent body will make it easy for the robot to sneak through narrow reefs without being damaged or detected by other sea creatures," he said.

Instead of being powered by traditional rigid motors, the fish is built with artificial muscle, stimuli-responsive polymers that can bend or stretch under a cyclic voltage provided by the embedded lithium battery.

"Soft artificial muscle can respond quickly to electricity, meaning faster fin flapping and greater speed," Li said.

At top speed, the robot can swim six centimeters per second, beating the previous record for soft untethered underwater robots by three centimeters per second.

With a tethered exterior power supply, the fish can swim up to 14 centimeters per second, about the same speed as similar-sized fish.

"The materials used in the robot are common, cheap and environment friendly, with the potential to be produced on a large scale in China," Li said. "Our next step is to improve the efficiency of the artificial muscle and develop key techniques for mass production."

The findings were published in the academic journal Scientific Advances earlier this month.