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A swarm of robots weaves giant cocoons using fibreglass thread



*A swarm of robots created these fibreglass tubes
Kayser et al., Sci. Robot. 3, eaau5630 (2018)*

By Yvaine Ye

Dozens of spiral tubes emerged from the ground overnight, constructed like giant cocoons. These weren't created by nature, but by a swarm of silkworm-inspired robots called Fiberbots. These robots could one day help build bridges or buildings. Each Fiberbot is a 30-centimetre-tall cylinder with a thin arm sticking out from the

top. To build a tube, the robot's arm winds fibreglass thread around its body. After creating an 8-centimetre long segment, Fiberbot then crawls forward to build the next section.

As constructions often require more than a single pipe, Neri Oxman at Massachusetts Institute of Technology and colleagues created 22 Fiberbots that could work as a swarm to test the technique at scale. They pre-programmed each robot with unique information about the length and curvature of the products, and installed an algorithm to prevent collision.

Over the course of 12 hours, the swarm built a selection of different curved tubes with heights ranging from 2.5 to 4.1 metres. None of the Fiberbots collided into each other.



"Fibres are the bricks of the future. We will see fibres appearing everywhere, across

scales and applications, including carrying and transferring data between bodies, buildings and environments,” says Oxman.

Fibreglass is a light-weight material that has been used to make hollow golf clubs, pipes and even spacecraft components. It can bear more weight than some metals and tolerate extreme environmental conditions, such as strong wind and temperature. However, transporting these bulky tubes, or their moulds, is very difficult.

Previous tube-building robots have had to choose between long and curved products. But Fiberbot can control both features by constructing section by section.

By adding cameras or laser sensors, Fiberbots could work without any pre-planning in the future, says Oxman. They could be useful when working in remote, or even extraterrestrial environments, she says.

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