Press Release

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World first soft robots walk off 3D printer that makes them

Scientists have created the first soft robots that can walk straight out of the machines that make them.

The flexible, four-legged devices were developed using a new 3D printing system, which could pave the way for the use of intelligent soft robotic systems with no electronic parts.

Soft machines – made from compliant materials such as soft plastics – have huge potential for use in areas such as nuclear decommissioning, the biomedical sector and in space, researchers say.

A lack of standardised design and manufacturing processes, expense and the need for specialist expertise has so far limited real-world use of the devices, experts say.

A team from the University of Edinburgh sought to overcome these challenges by developing a low-cost, desktop 3D printing system for creating soft robots.

Their user-friendly setup can be assembled for less than £400 using off-the-shelf parts.

The team demonstrated the capabilities of their new system by creating robots made solely from a soft plastic material and powered by air pressure.

Once printed, the palm-sized devices are connected to a compressed air supply before walking out of the machine on which they were made.

Building and operating the new system – known as the Flex Printer – requires little prior knowledge, with first-time users able to assemble it and begin making robots in just a few days, the team says.

They have made their designs publicly available to broaden access to soft robotic technologies and to help foster collaboration and improvements to the system.

The findings are published in the journal *Device,* part of the prestigious Cell Press group of journals. The research was funded by the Engineering and Physical Sciences Research Council (EPSRC).

The lead engineer on the project was Maks Gepner, with support from Jonah Mack, both PhD students in the Centre for Doctoral Training in Robotics and Autonomous Systems. The lead academic was Professor Adam A. Stokes, Head of the Institute for Bioengineering at The University of Edinburgh.

Maks Gepner, of the University’s Schools of Engineering and Informatics, said: “It used to take years to figure out how to print using these materials. Using our new platform, anyone can now easily print things which were previously thought to be impossible. This is a game-changer for engineers and artists alike.

“Our hope is that this technology will help drive the next wave of research breakthroughs. Without the long-standing manufacturing and design bottlenecks holding it back, we believe soft robotics is ready to make a major real-world impact.”

For further information, please contact: Corin Campbell, Press and PR Office, 07920 404 319,**corin.campbell@ed.ac.uk**