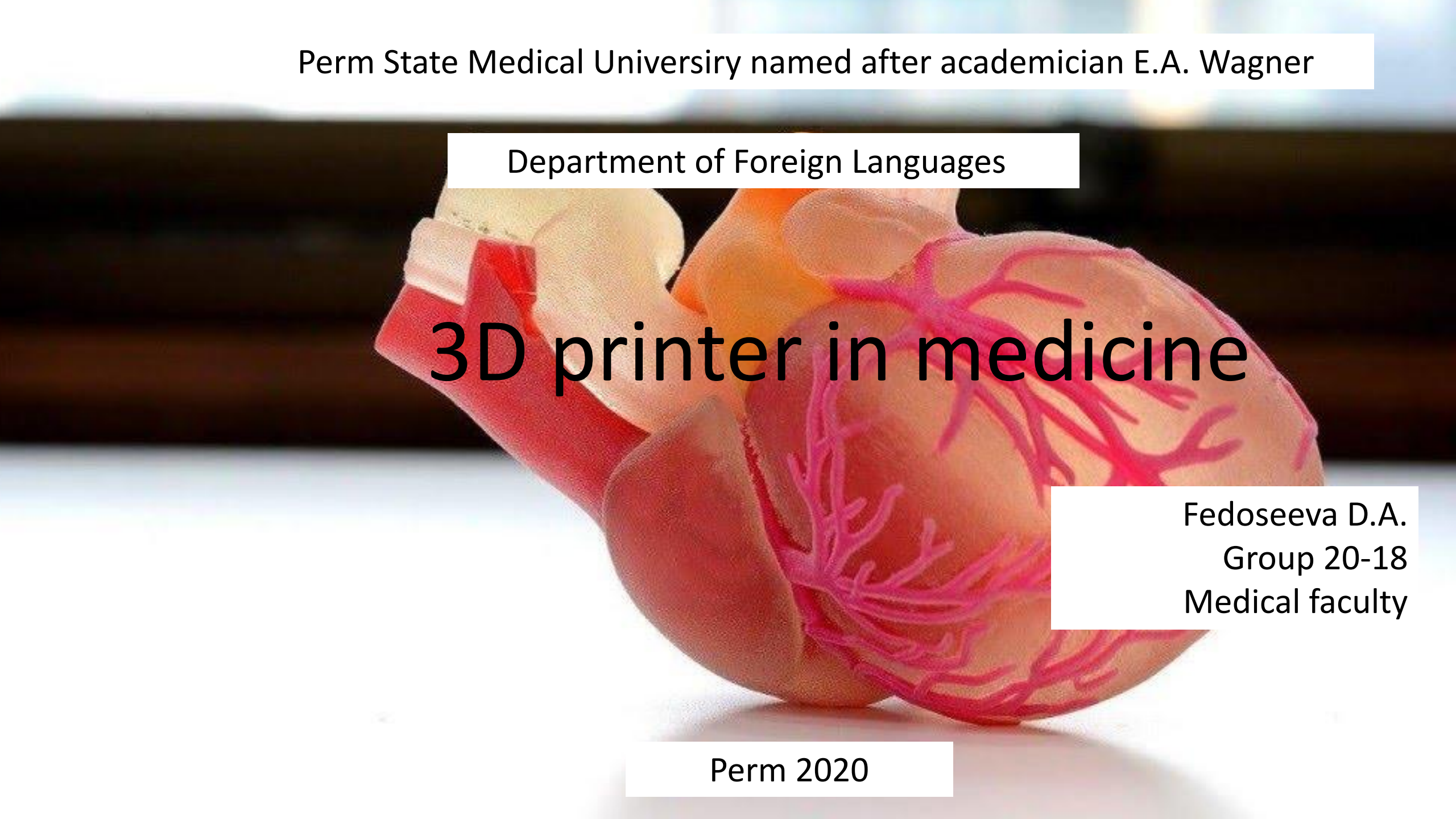
Perm State Medical Universiry named after academician E.A. Wagner

Department of Foreign Languages



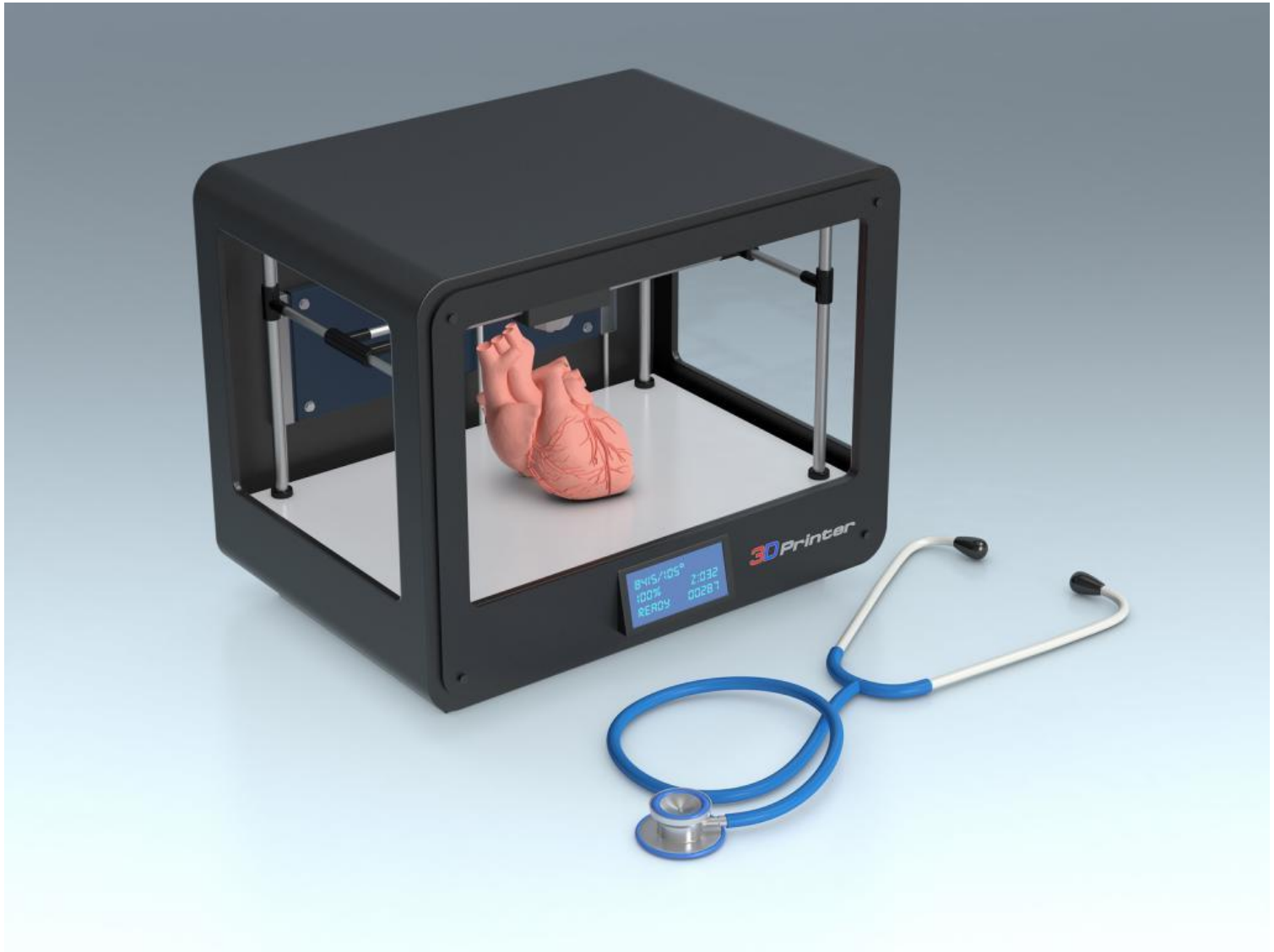
3D printer in medicine

Fedoseeva D.A.
Group 20-18
Medical faculty

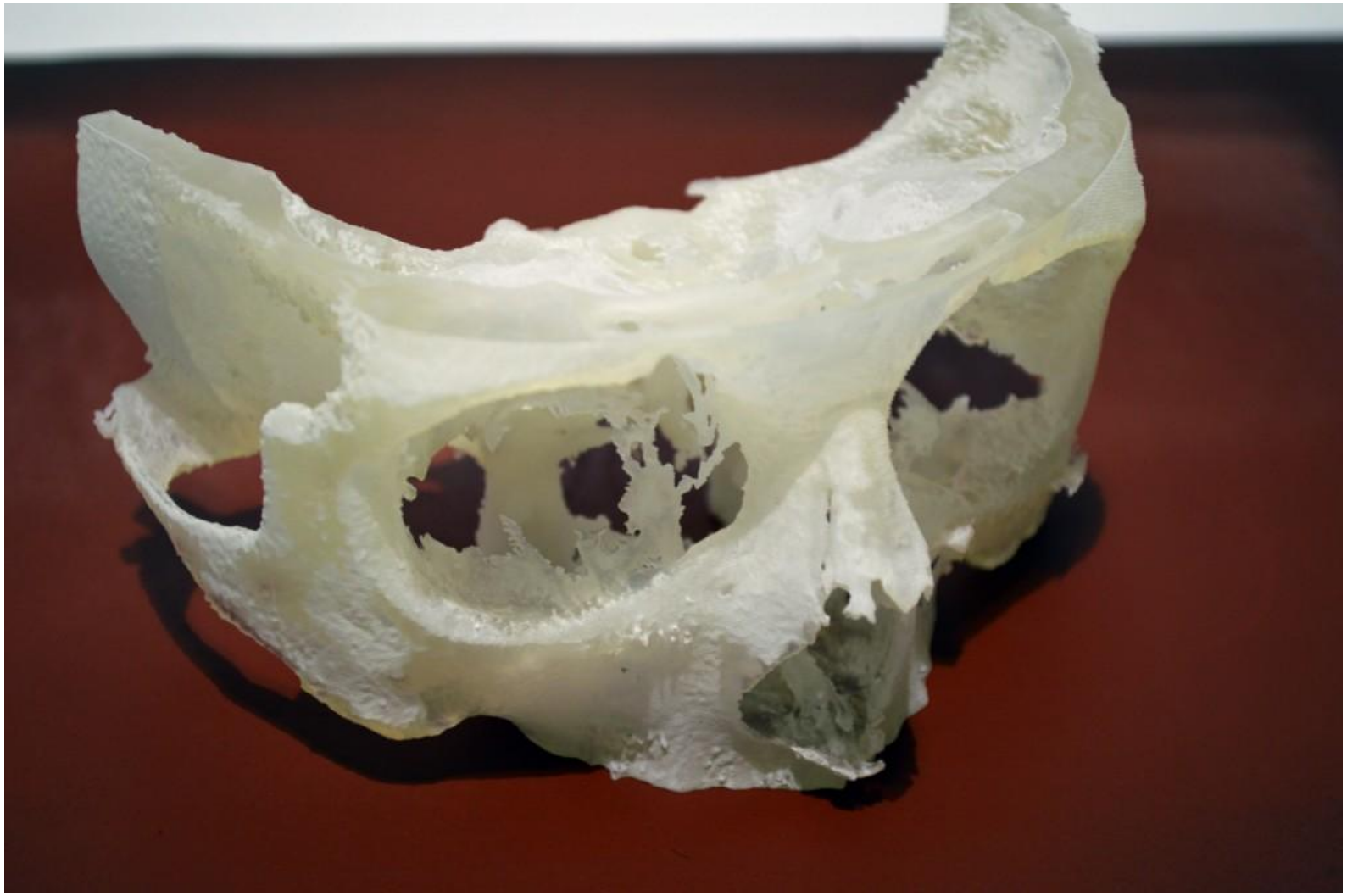
Perm 2020

Additive manufacturing, otherwise known as 3D printing, was first developed in the 1980s. It involves taking a digital model or blueprint of the subject that is then printed in successive layers of an appropriate material to create a new version of the subject.

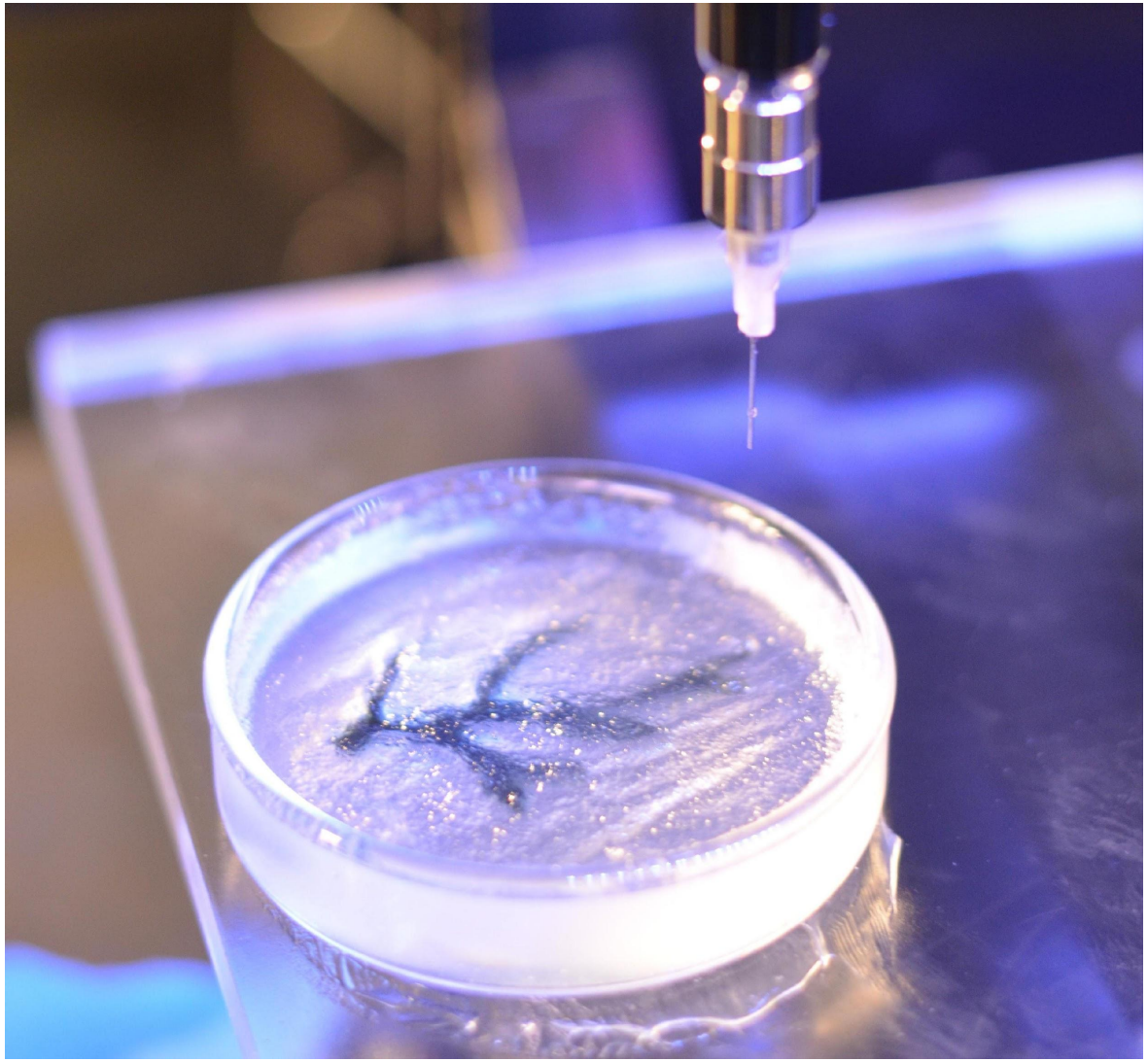
The technique has been applied to (and utilised by) many different industries, including medical technology.



There are four core uses of 3D printing in the medical field that are associated with recent innovations: creating tissues and organoids, surgical tools, patient-specific surgical models and custom-made prosthetics.

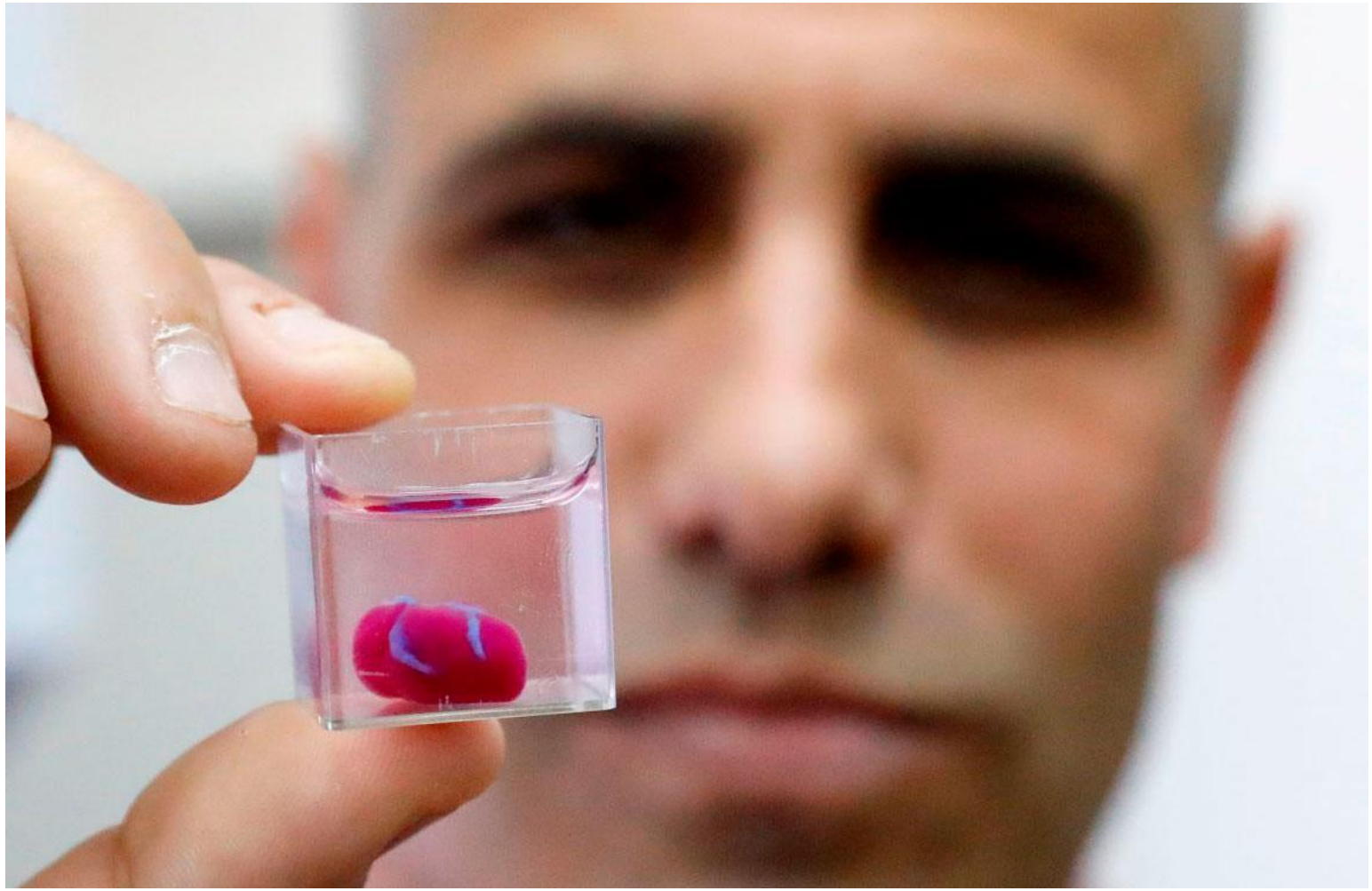


Bioprinting tissues and organoids

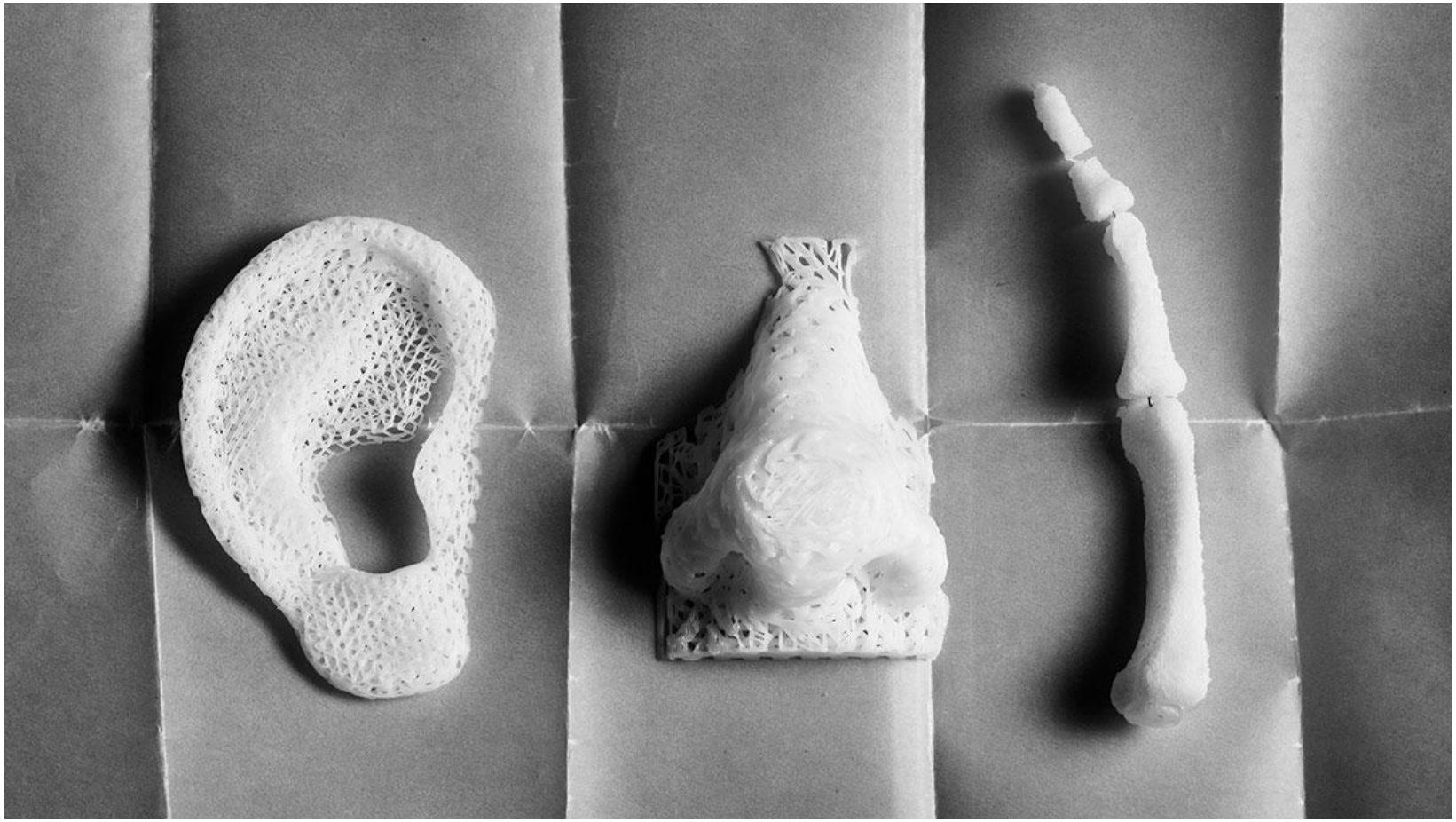


- One of the many types of 3D printing that is used in the medical device field is bioprinting. Rather than printing using plastic or metal, bioprinters use a computer-guided pipette to layer living cells, referred to as bio-ink, on top of one another to create artificial living tissue in a laboratory.

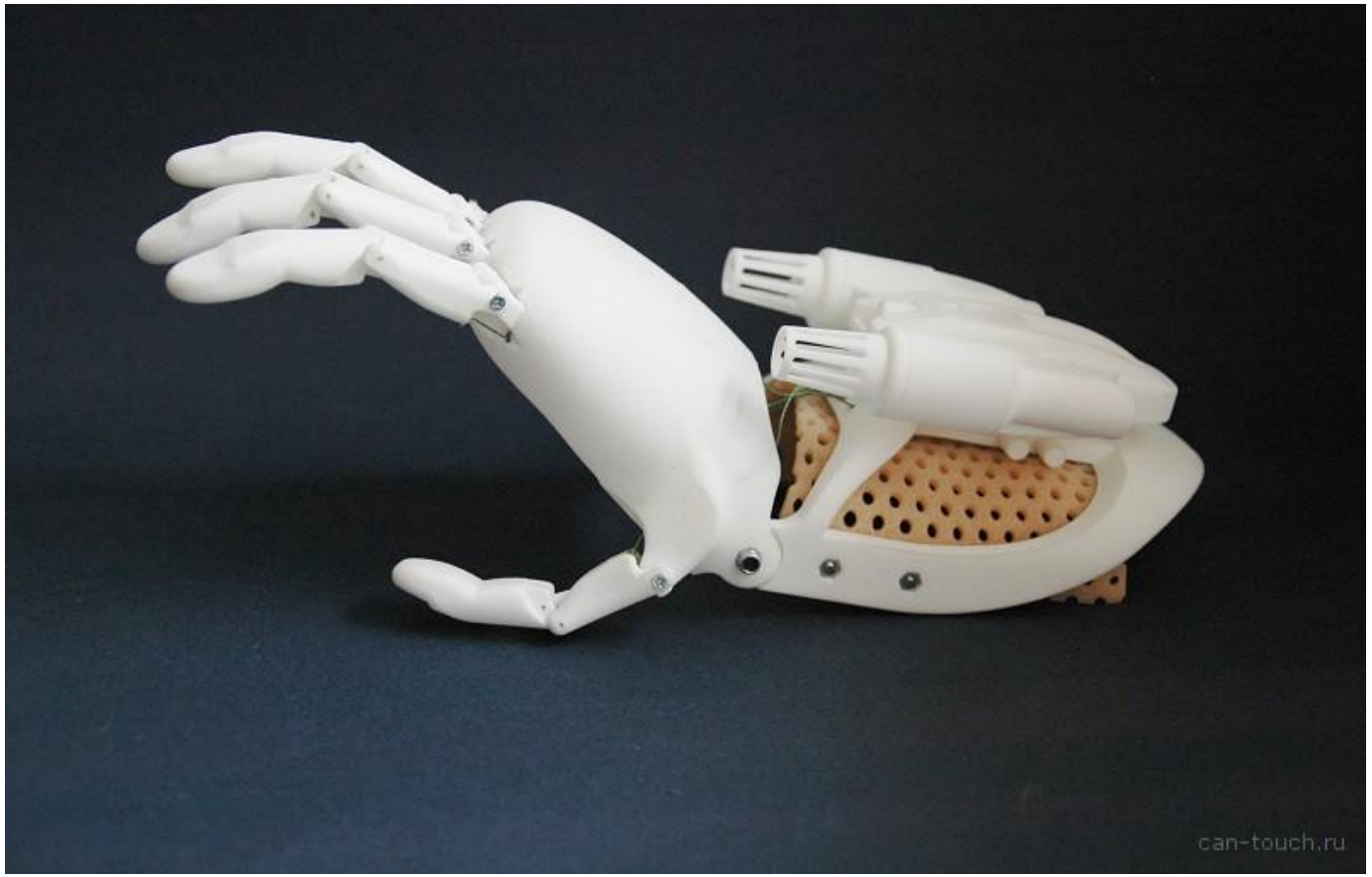
These tissue constructs or organoids can be used for medical research as they mimic organs on a miniature scale. They are also being trialled as cheaper alternatives to human organ transplants.



Another application of 3D printing in the medical field is creating patient-specific organ replicas that surgeons can be use to practice on before performing complicated operations. This technique has been proven to speed up procedures and minimise trauma for patients.

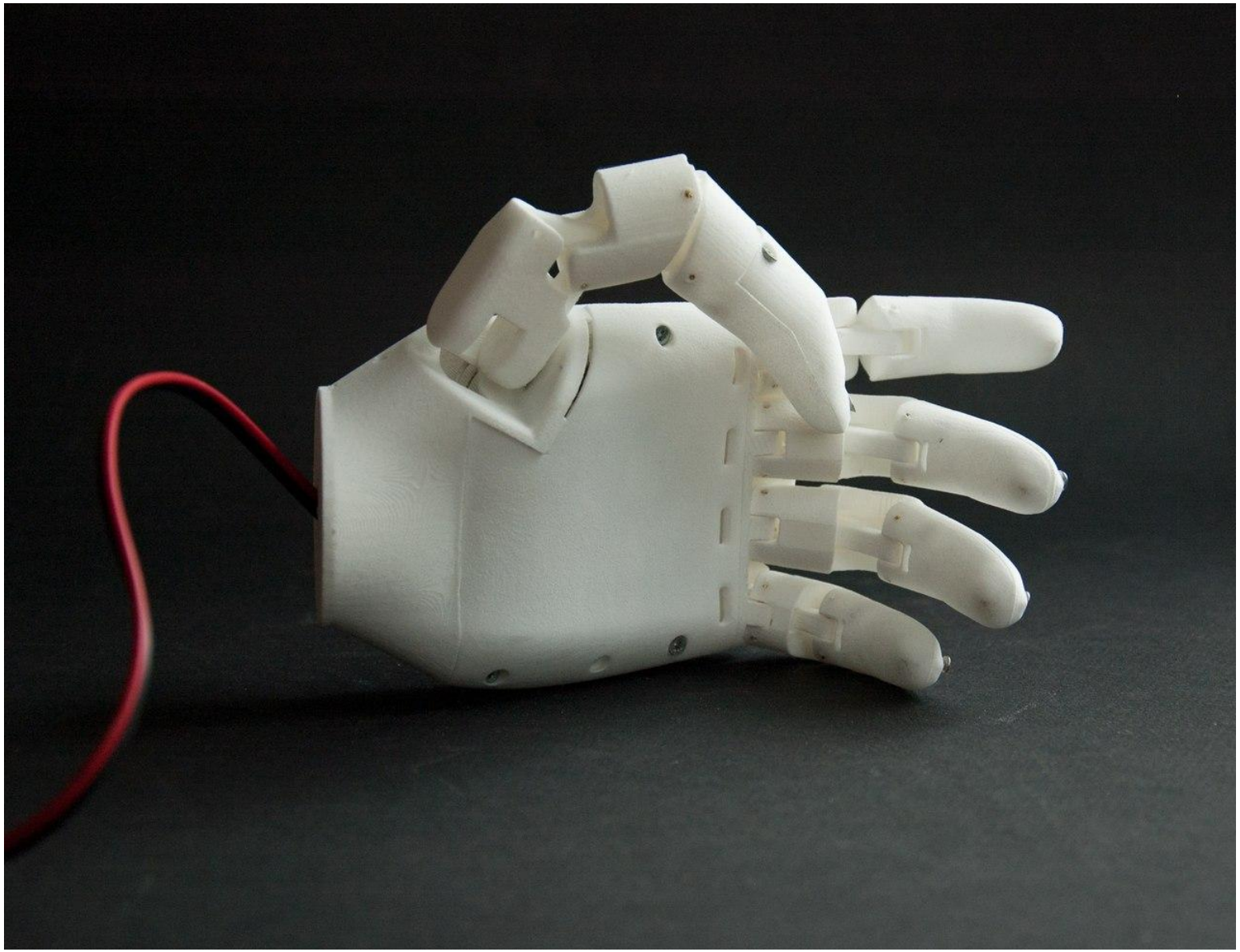


Custom-made prosthetics using 3D printing

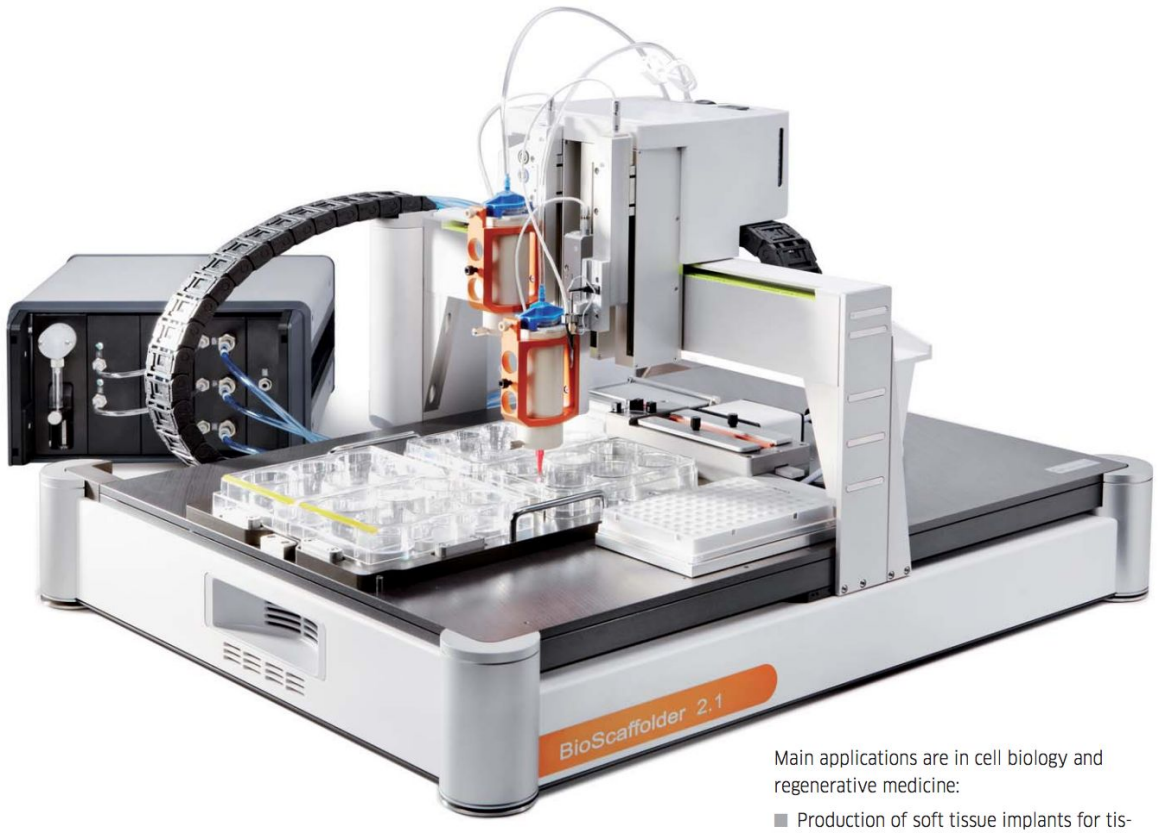


- 3D printing in the medical field can be used to produce prosthetic limbs that are customised to suit and fit the wearer.

It is common for amputees to wait weeks or months to receive prosthetics through the traditional route; however, 3D printing significantly speeds up the process, as well as creating much cheaper products that offer patients the same functionality as traditionally manufactured prosthetics.



3D printing of surgical instruments



Main applications are in cell biology and regenerative medicine:

- Production of soft tissue implants for tissue engineering

- Sterile surgical instruments, such as forceps, hemostats, scalpel handles and clamps, can be produced using 3D printers.
- One of the main benefits of using 3D printing rather than traditional manufacturing methods to produce surgical instruments is the production costs are significantly lower.