Contemporary applications and trends the application of plastic in medicine through 3D printing

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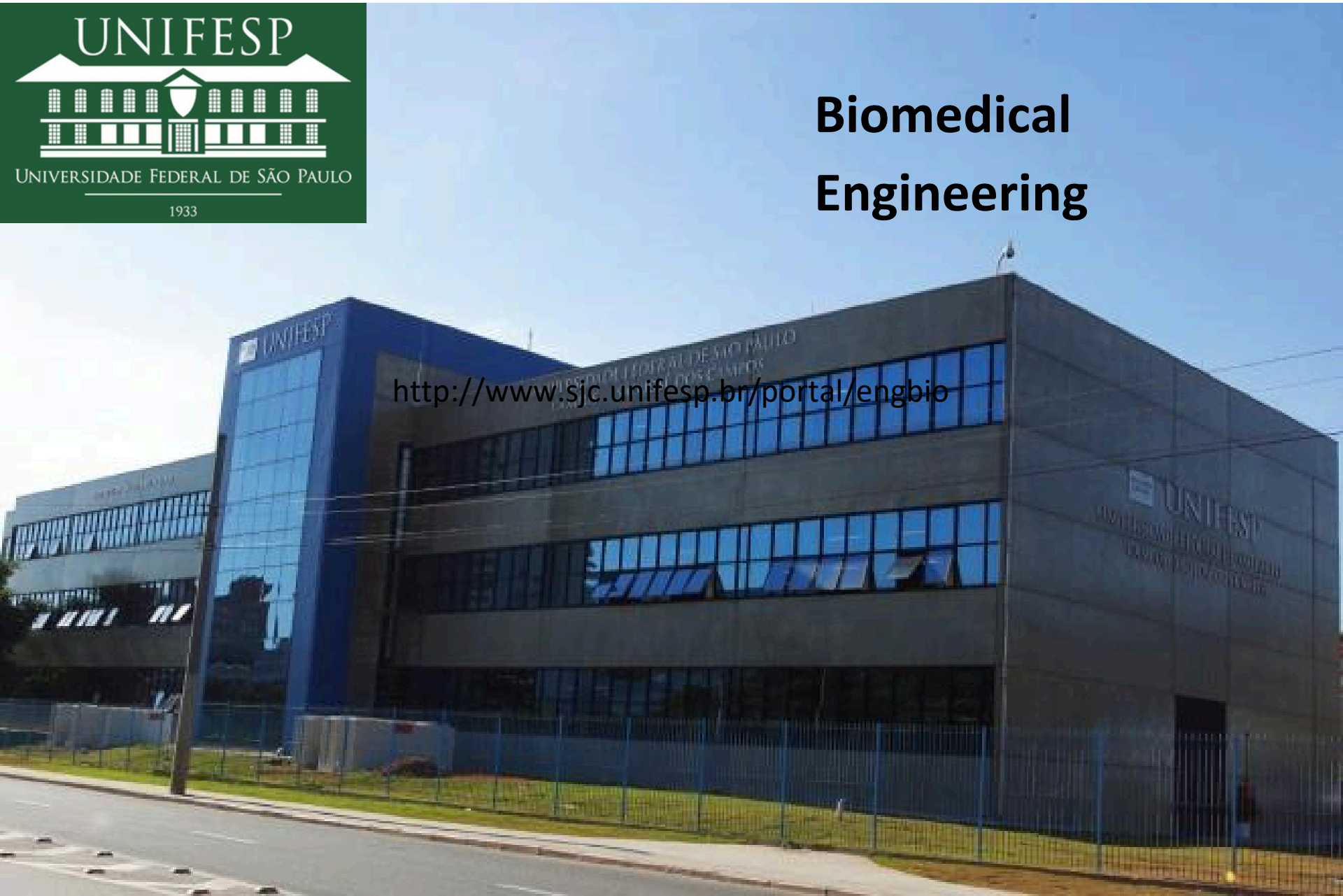
Institute of Science and Technology, UNIFESP



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Biomedical Engineering

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History of three-dimensional printing

1980 → Development of the 3D printer Components for the automotive sector Prototype production for testing purposes

Ex: Food, toys, musical instruments.

residences, cuisine, automobiles...

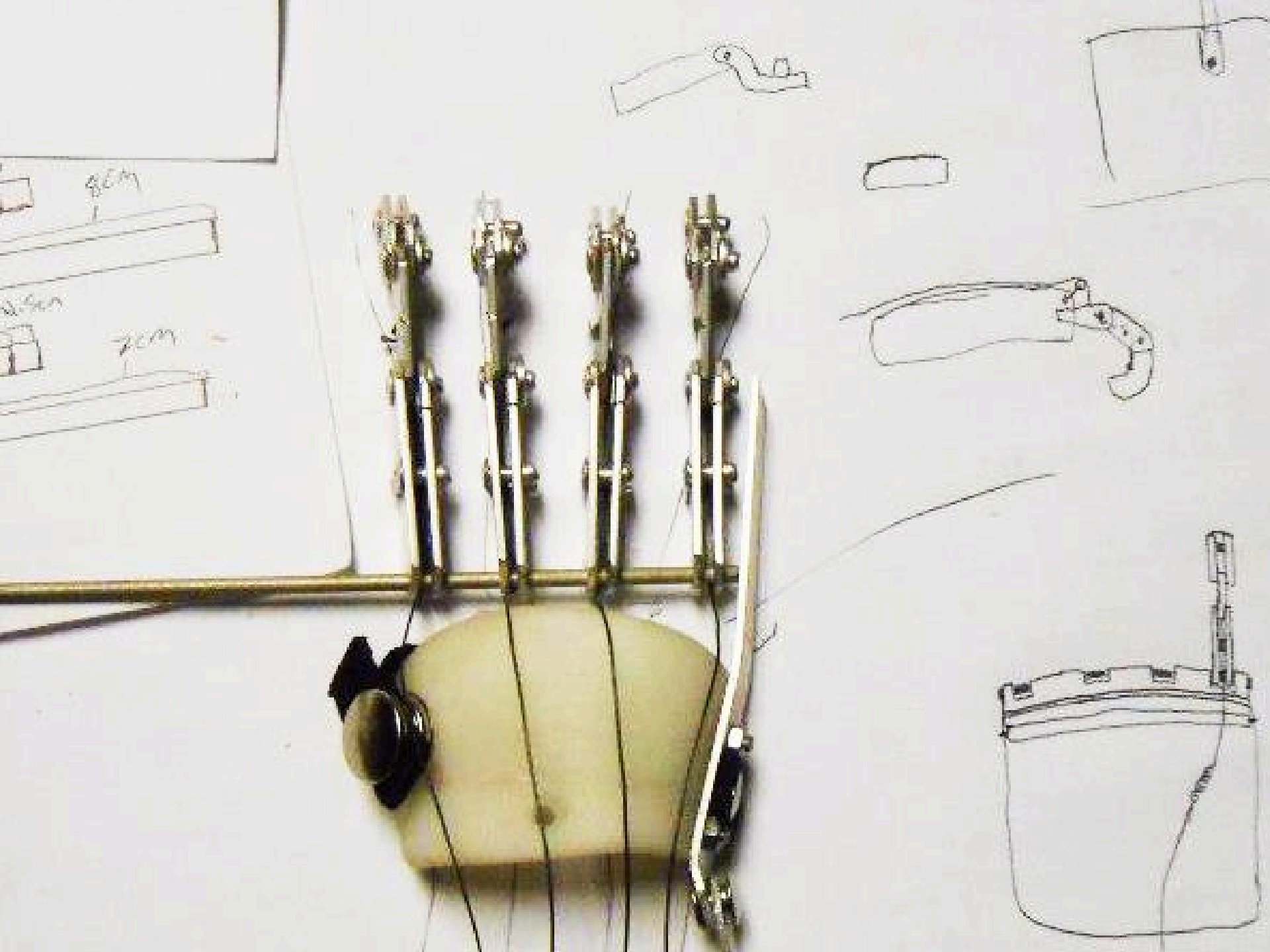
2002 - 2004 the sector of health commenced investment in 3D technology

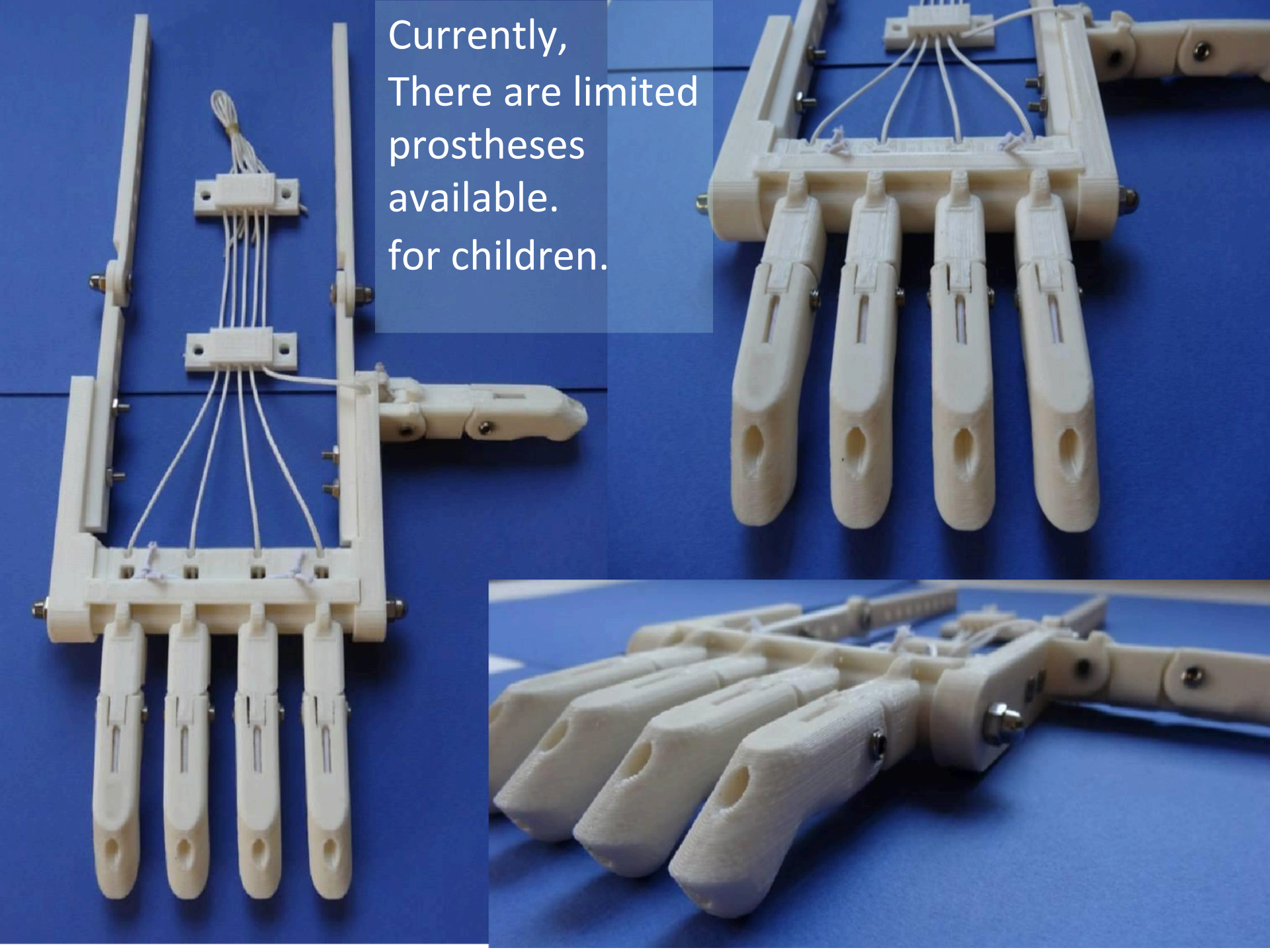
What can already be done TODAY in medicine with 3D printing technology and different types of plastics ?

3D printing utilizing plastic as a substitute for amputated limbs

“Necessity is the mother of invention"

Plato (427–347 BC) The Republic




Currently,
There are limited
prostheses
available.
for children.

University hosts studies for the development of hand prosthesis

Create a superhero hand for a child born without digits...

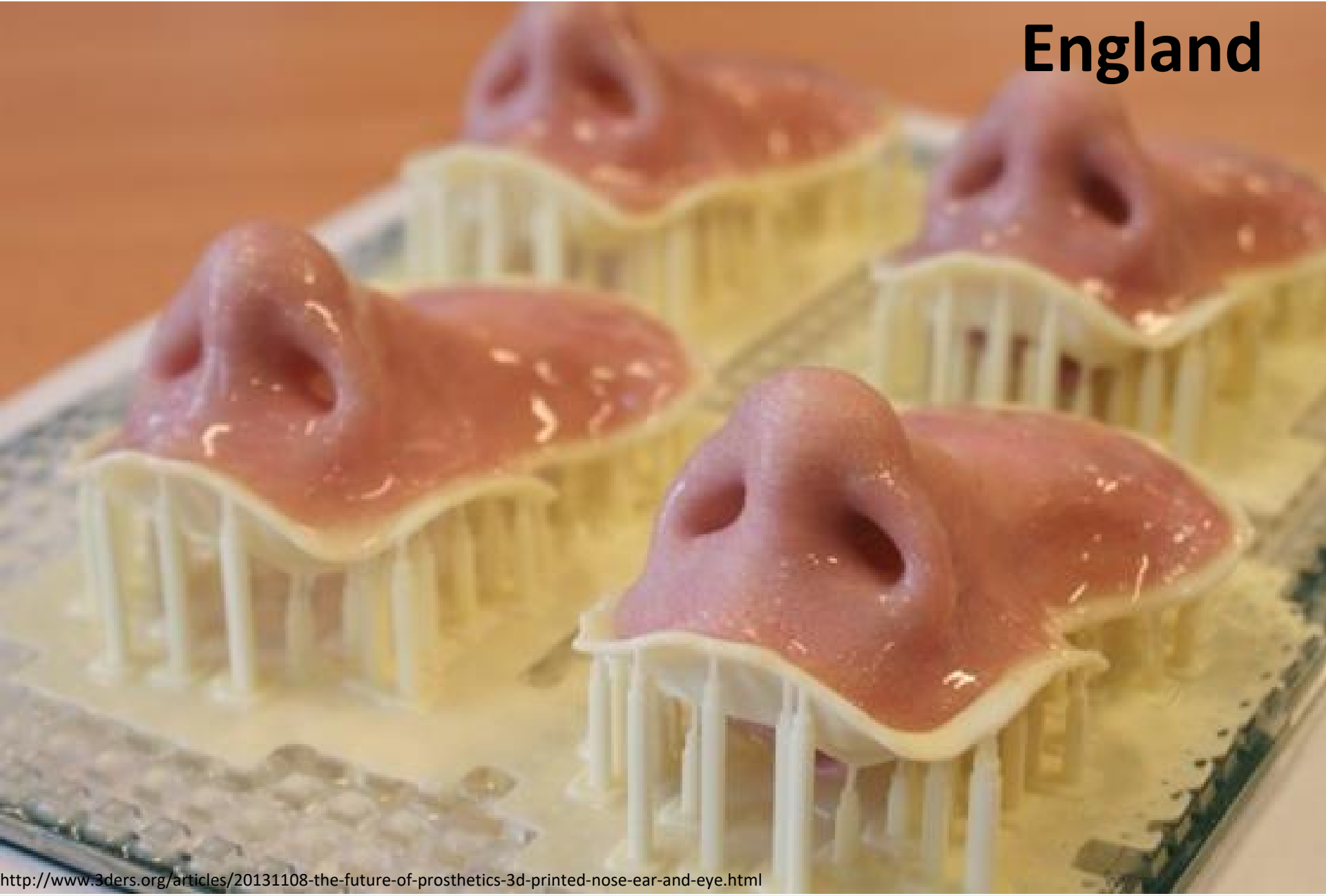
http://www.istoe.com.br/reportagens/381936_GAROTINHO+QUE+NASCEU+SEM+OS+DEDOS+GANHA+PROTESE+DE+IRONMAN?actualArea=internalPage&path=&pathImagens=

USA

http://revistacrescer.globo.com/Curiosidades/noticia/2014/08/menino-recebe-prosthesis-de-arco-feita-por-impressora-3d-e-realiza-sonho-de-abracar-mae.html

Create a regulated arm for a boy who was born without...

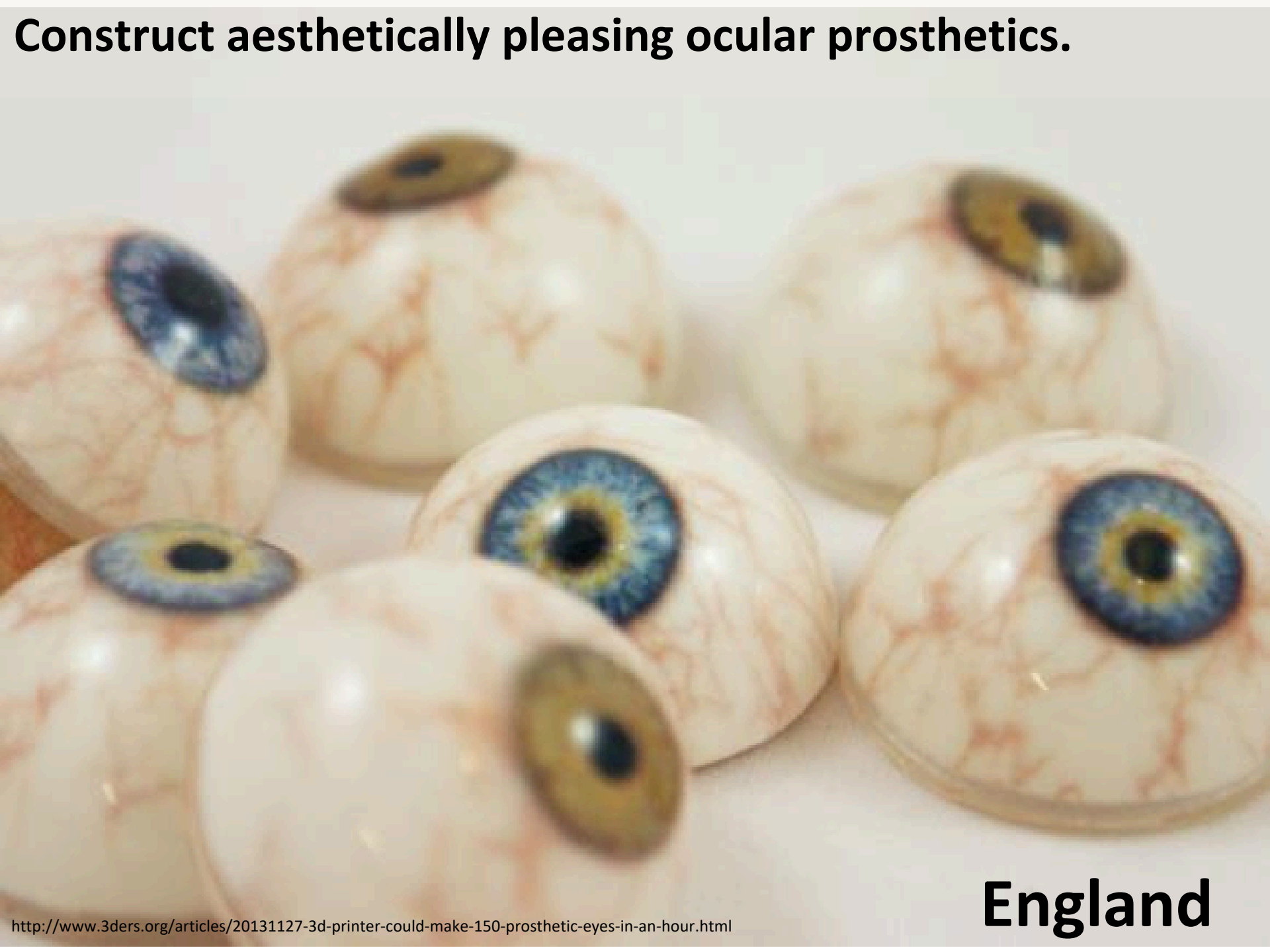
USA



http://www.3ders.org/articles/20131108-the-future-of-prosthetics-3d-printed-nose-ear-and-eye.html

Construct an aesthetically pleasing nasal prosthesis...

Construct aesthetically pleasing ocular prosthetics.



England

http://www.3ders.org/articles/20131127-3d-printer-could-make-150-prosthetic-eyes-in-an-hour.html

USA

http://info.abril.com.br/noticias/ciencia/pesquisadores-criam-orelha-bionica-com-impressora-3d-27052013-12.shl

Creating auricular prostheses with ear...

4 applications of 3D printing utilizing plastic for assist individuals with visual impairments

http://gizmodo.uol.com.br/novo-software-permite-que-deficientes-visuais-imprimam-um-mapa-em-3d-para-andar-pela-cidade/

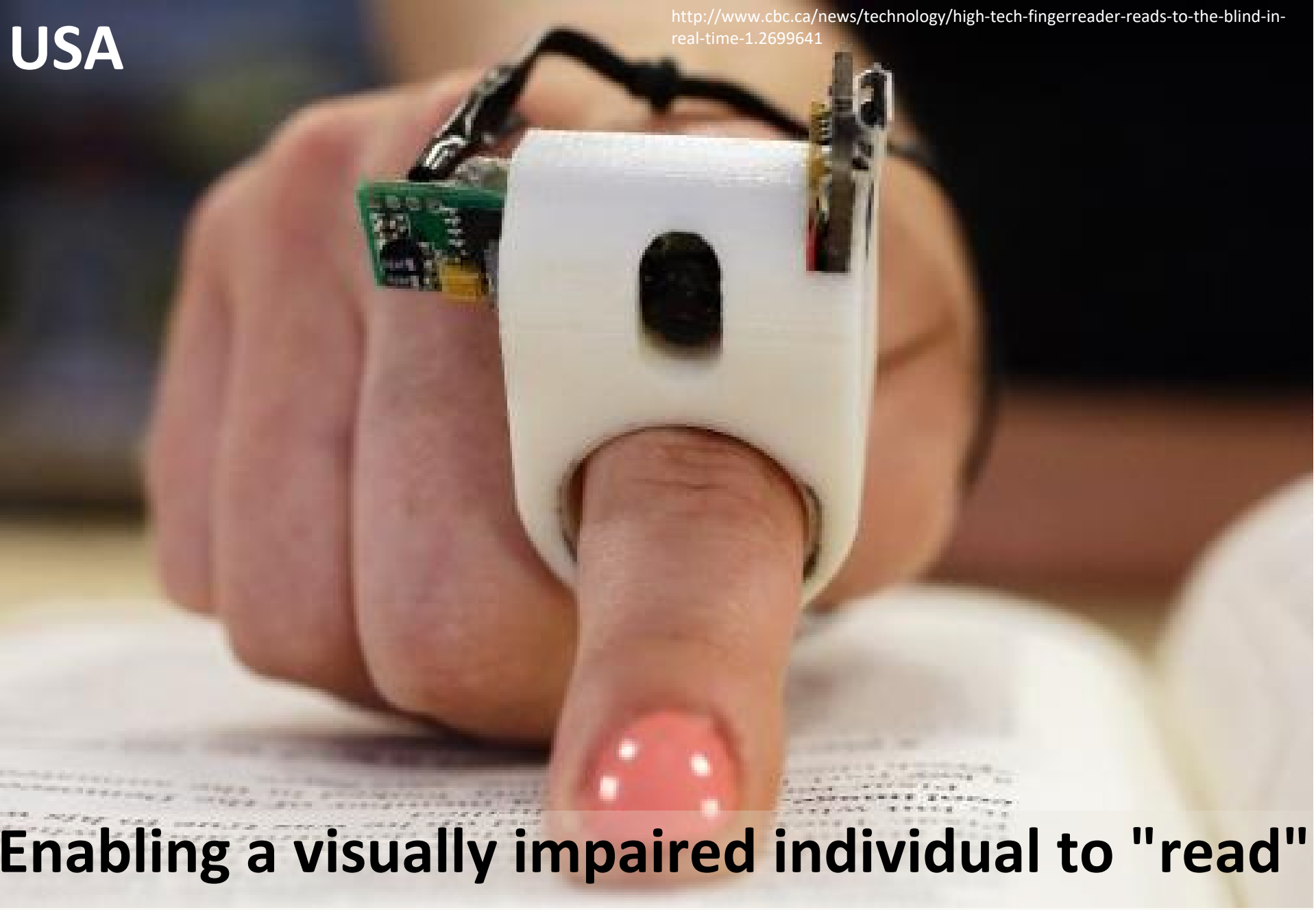
Permit individuals with visual impairments to navigate through tactile exploration.

a three-dimensional map to navigate the city...

Enable individuals with visual impairments to engage with the elements of a photograph in three dimensions.

USA

http://www.cbc.ca/news/technology/high-tech-fingerreader-reads-to-the-blind-in-real-time-1.2699641



Enabling a visually impaired individual to "read" a printed book without the use of Braille...

Creating replicas of fetuses still in their mother's womb...

3 applications of 3D printing utilizing plastic for surgical procedures

It is feasible to replicate surgical procedures in a plastic femur that closely resembles that of a patient, prior to the actual operation...

1. Acquiring a two-dimensional image of the femur
2. 3D image reconstruction
3. CAD models → STL
4. 3D printing of the femur.

Planning a cardiac procedure for a two-week-old infant...

Cardiology

https://tecnoblog.net/166940/coracao-impresso-3d/

USA

Assisting physicians in the implementation of a new skull on a woman...

https://tecnoblog.net/154054/cranio-impressora-3d-e-implantado-mulher-doenca-ossos/

Replacing 75% of a man's skull...

USA

Brazil – Campinas Technology Institute

Replacing 75% of a child's skull...

http://www.extremetech.com/extreme/150354-75-of-a-human-skull-replaced-with-3d-printed-material

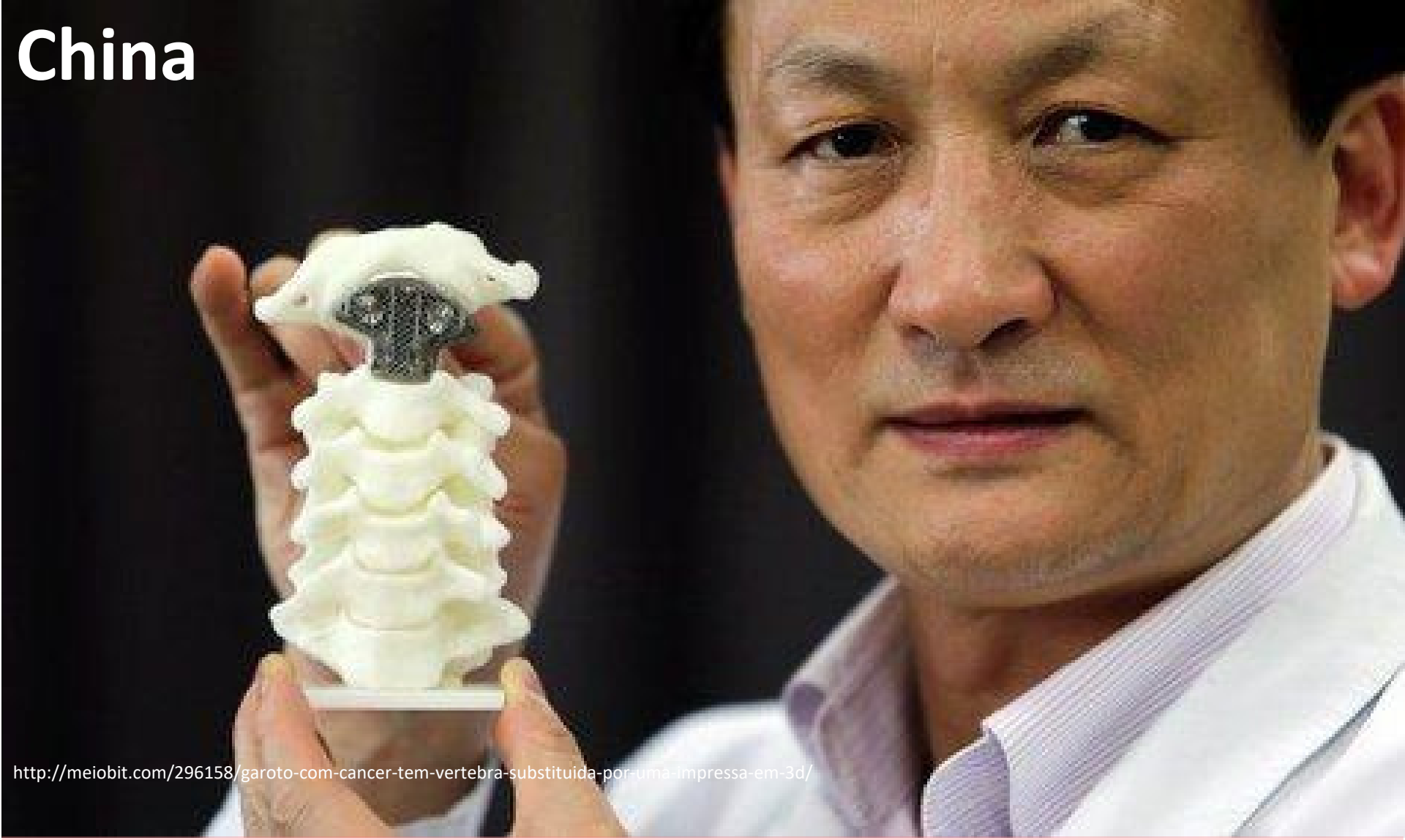
Brazil

http://veja.abril.com.br/noticia/ciencia/medicina-impressa-os-avancos-que-a-tecnologia-3d-trouxe-a-saude

Plan for facial reconstruction.




China



http://meiobit.com/296158/garoto-com-cancer-tem-vertebra-substituida-por-uma-impressa-em-3d/

Replacing a vertebra affected by a malignant tumor in a 12-year-old boy...


USA
Planning for a baby's neurosurgery...

USA

Create and implant a tracheal prosthesis to save a baby's life.

http://exame.abril.com.br/tecnologia/noticias/protese-criada-com-impressora-3d-salva-vida-de-bebe-nos-usa

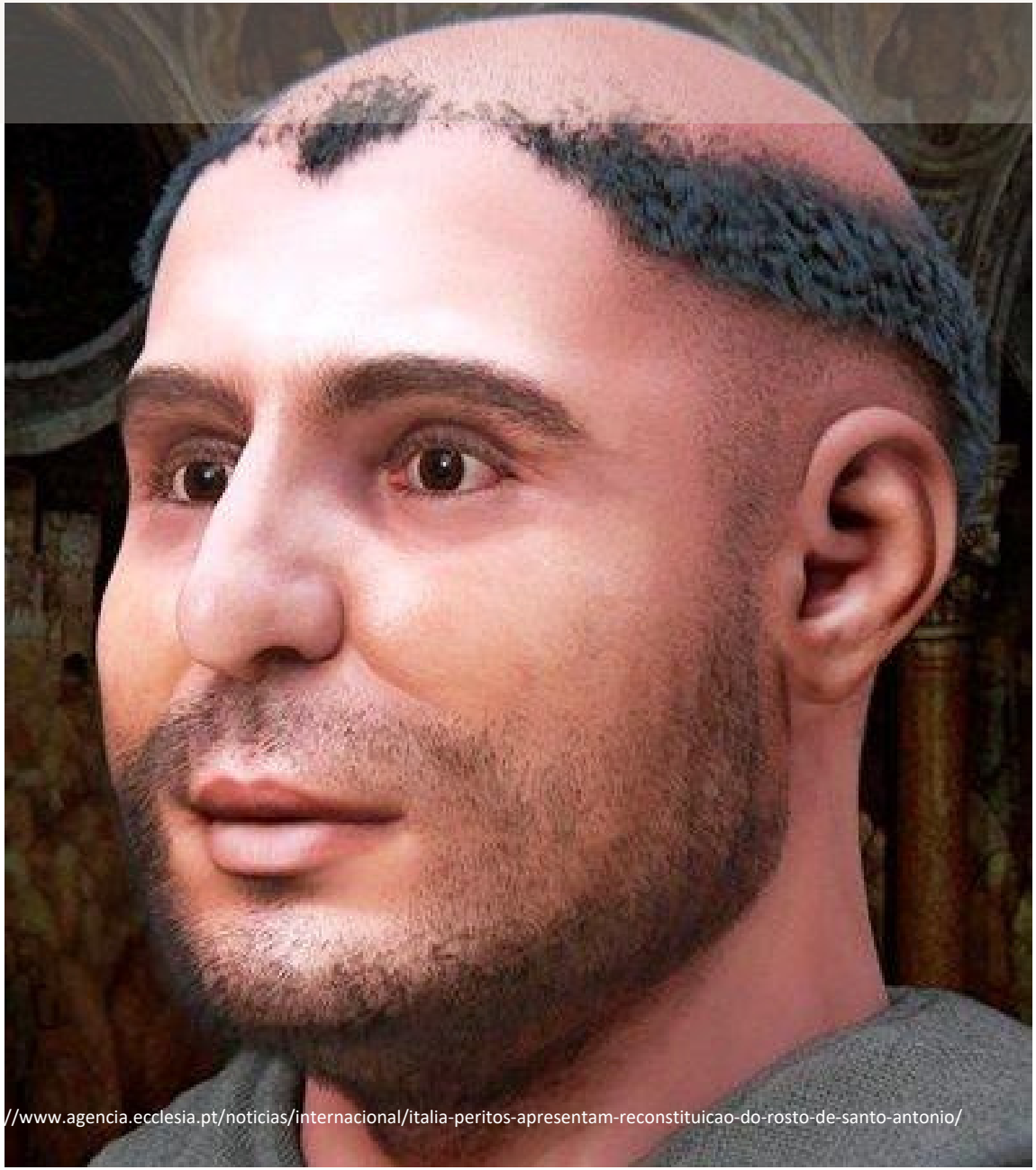
2 applications of printing 3D technology in forensics for the identification of individuals from their remains mortals

Conduct forensic facial reconstruction without the utilization of a skull.

USA

http://3dprint.com/20664/3d-printing-facial-reconstruct/

Reveal the visage of a saint from his skull...



//www.agencia.ecclesia.pt/noticias/internacional/italia-peritos-apresentam-reconstituicao-do-rosto-de-santo-antonio/

Cicero Moraes

Brazil

Alternative applications of Three-dimensional printing in medicine

http://www.3dprinter.net/animals-helped-with-3d-printing

http://www.techtudo.com.br/noticias/noticia/2014/08/impressora-3d-fabrica-fones-sem-fio-com-formato-do-ouvido-do-usuario.html

USA

Creating wireless headphones that conform to the user's ear shape...

http://www.techtudo.com.br/noticias/noticia/2014/09/vestido-impresso-em-3d-funciona-com-chip-edison-da-intel-e-tem-sensores.html

Netherlands

Designing garments that encapsulate data biological rhythms and heartbeats...

http://tecnologia.uol.com.br/album/2014/06/06/pecas-feitas-em-impressora-3d-promise-to-change-lives-conheca.htm#fotoNav=11

Replace plaster with a hollow structure. with the ultrasound system...

Eng. Tomaz Puga Leivas - Biomanufacturing of Bio Models

“3D printing represents a potential game changer... a plastic that costs mere cents enables researchers to explore significant scientific inquiries, thereby conserving both time and resources.”

Francis Collins, Director of the National Institutes o
Health, United States (NIH

Thank you very much!

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flip.it/sAvuS