Peter Walters, Research Fellow, Centre for Fine Print Research,
University of the West of England

“Design at the intersection of smart materials and 3D printing”

Invited speaker at:

The 2nd 4D Printing & Meta Materials Conference, February 01, 2017,
Brightlands Chemelot Campus in Sittard-Geleen, The Netherlands.

https://www.4dpmmconference.com/program-2017/




Peter Walters

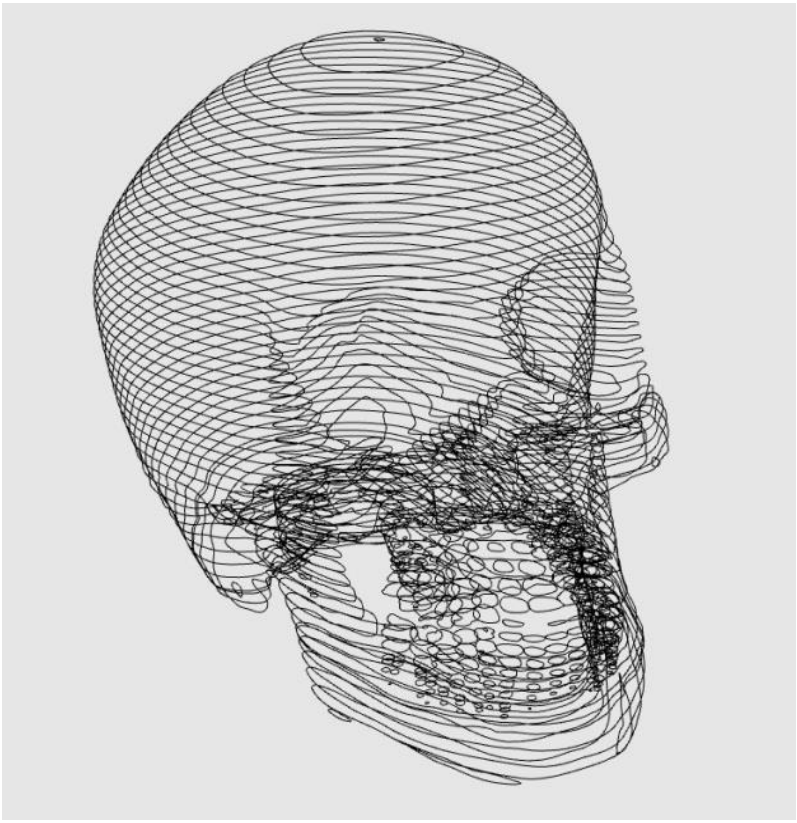
Design at the intersection of 3D printing and smart materials

Centre for Fine Print Research
University of the West of England, Bristol

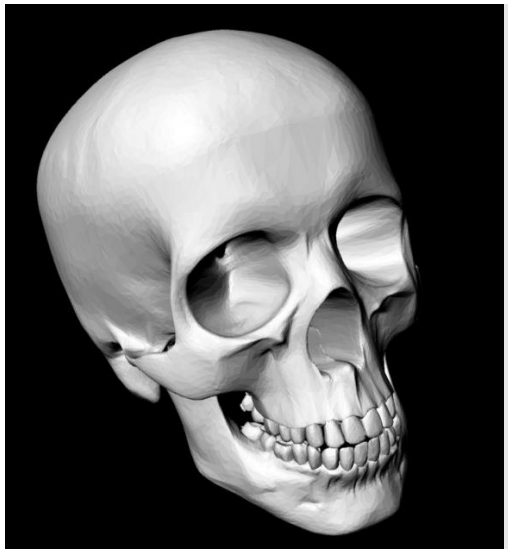
3D Printing?

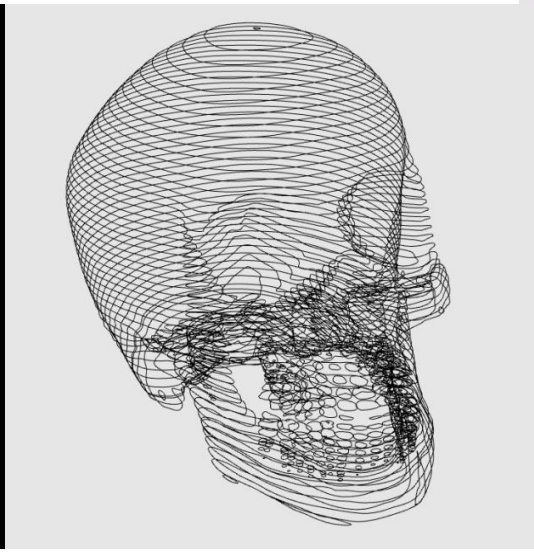
Skulls by Verity Lewis (2011)
Powder Binder 3D Printing

3D Virtual to 3D Physical >> Digital Fabrication



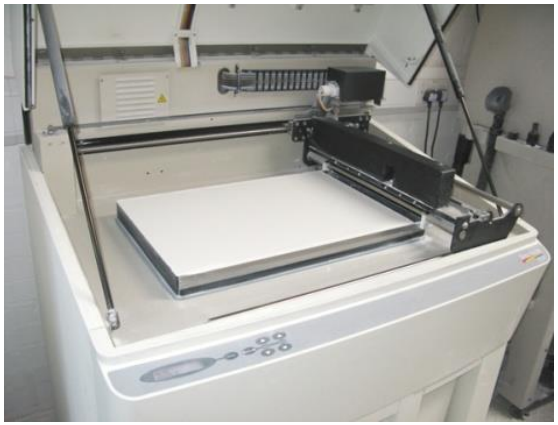
3D Virtual to 3D Physical >> Digital Fabrication

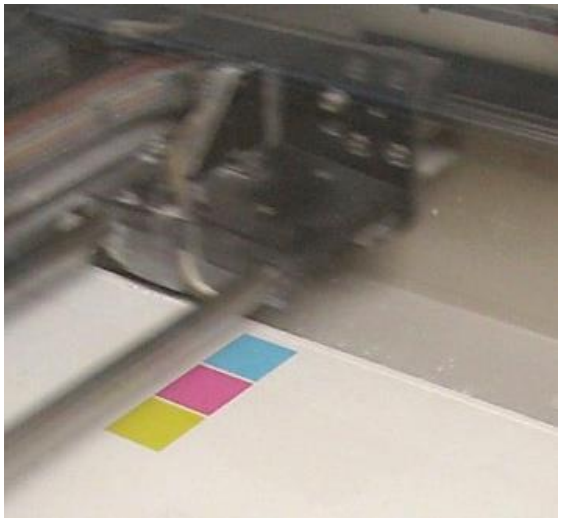


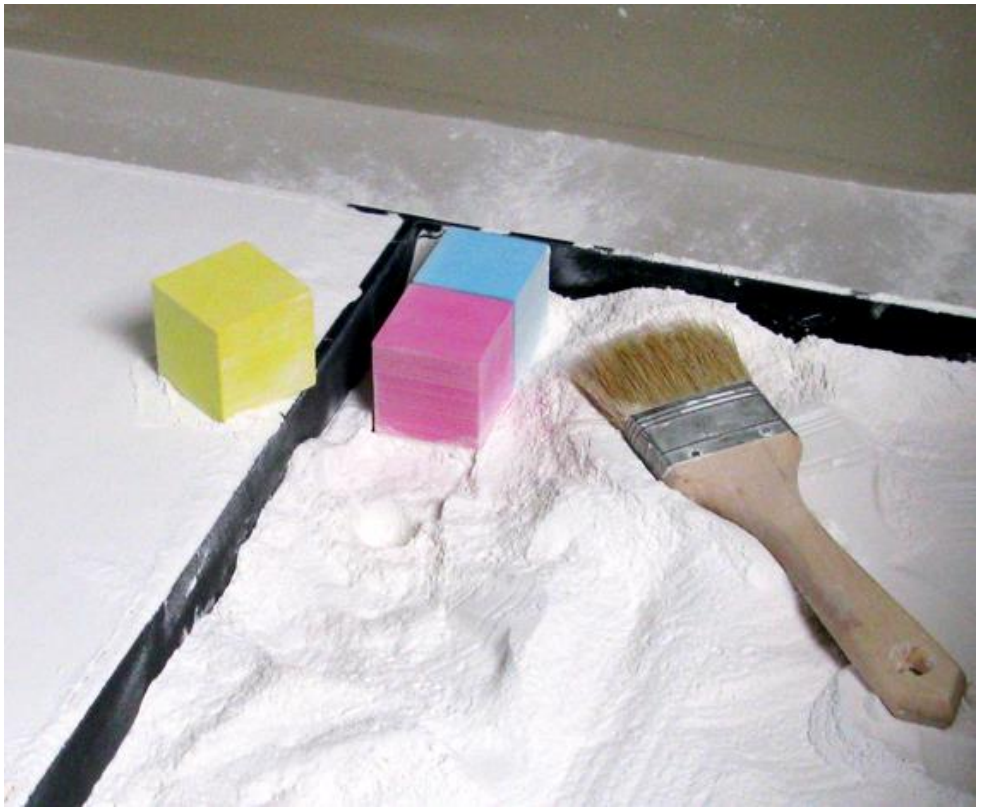


Skulls Verity Lewis (2011)
Powder Binder 3D Printing

3D Virtual to 3D Physical >> Digital Fabrication



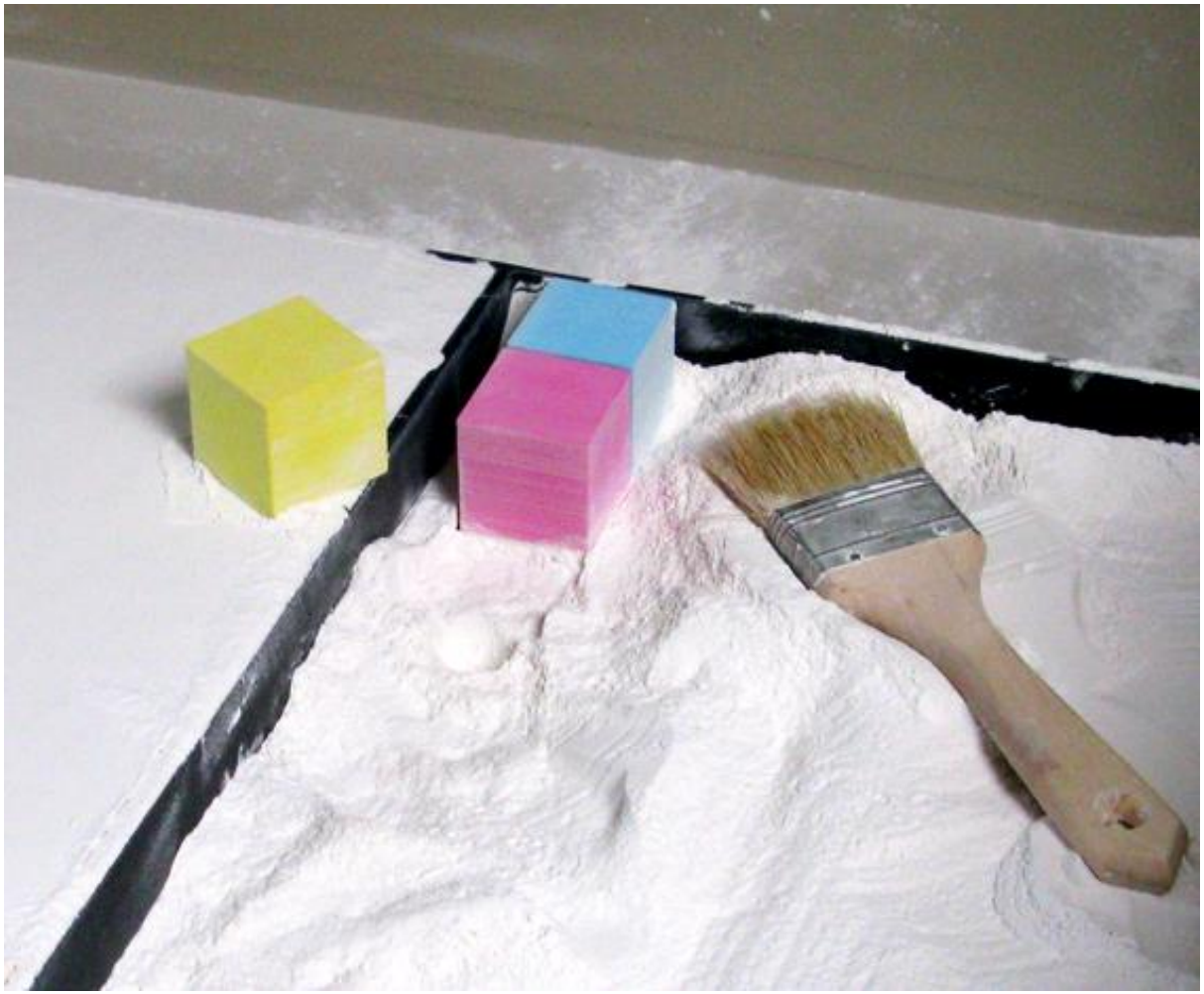




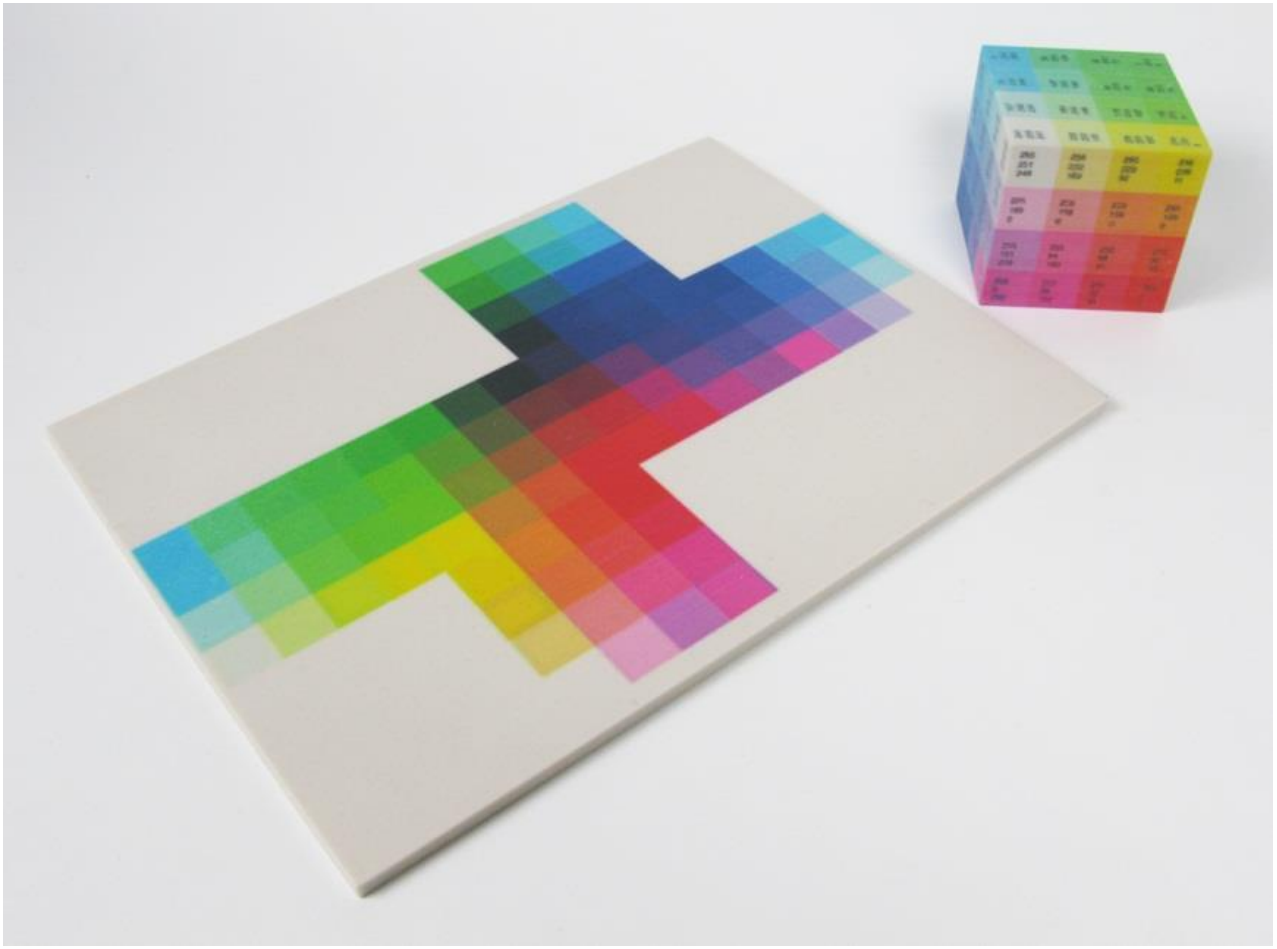
3D Virtual to 3D Physical >> Digital Fabrication

Zcorp 510
Powder Binder 3D Printing

3D Virtual to 3D Physical >> Digital Fabrication



3D Virtual to 3D Physical >> Digital Fabrication



3D Virtual to 3D Physical >> Digital Fabrication

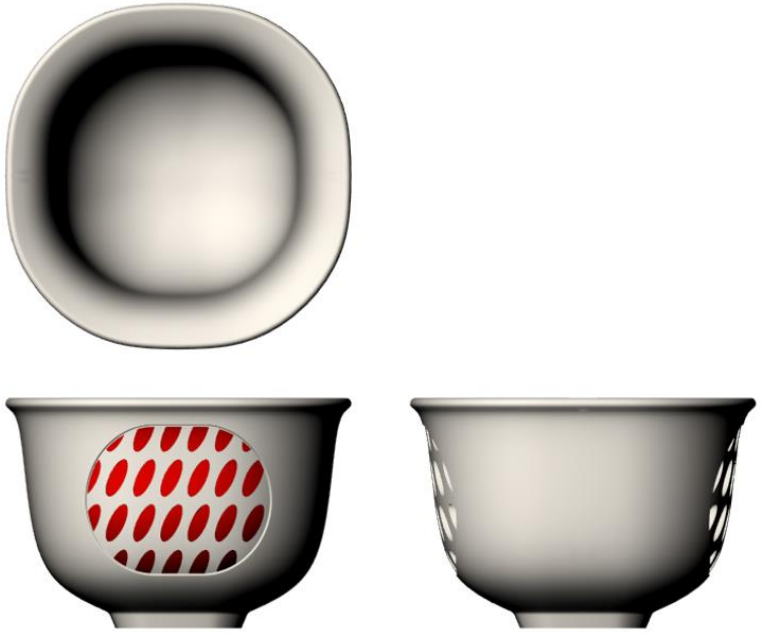
Complexity for free!

Trumpet Tiles and Trumpet Spheres (2009)

Peter Walters. Form and colour studies – Z-Corp 3D prints

AHRC funded research

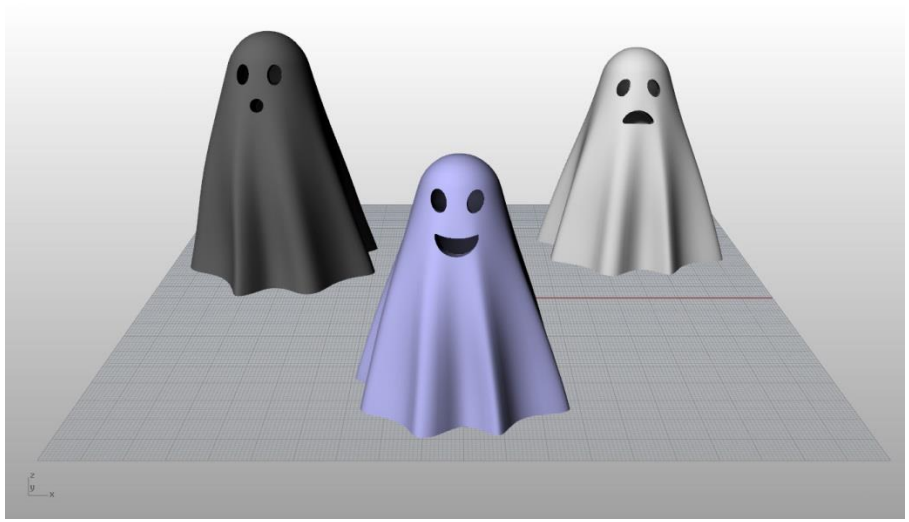
Ceramic 3D Printing



Tea Cup by Peter Ting

David Huson and Stephen Hoskins
Centre for Fine Print Research AHRC funded research project

Ceramic 3D Printing



Ghosts in the Machine by Peter Walters

David Huson and Stephen Hoskins
Centre for Fine Print Research AHRC funded research project

Ceramic 3D Printing

Ghosts in the Machine by Peter Walters

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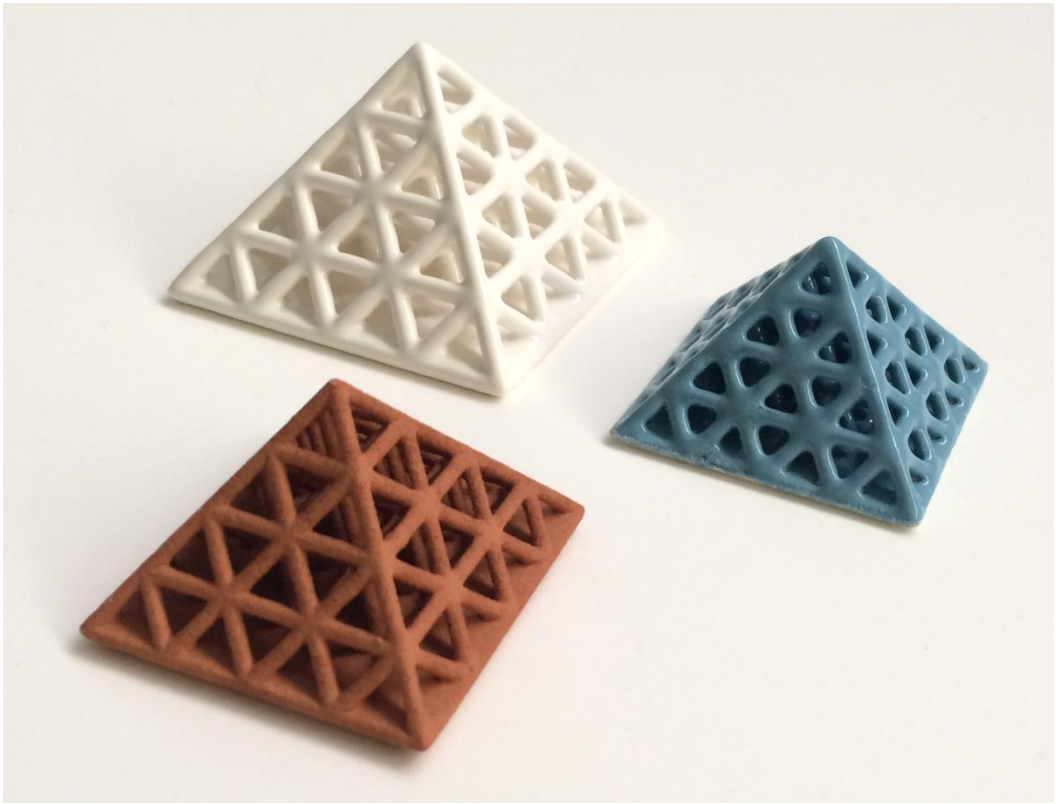
Centre for Fine Print Research AHRC funded research project

Ceramic 3D Printing



Many technical applications for ceramics with controllable porosity

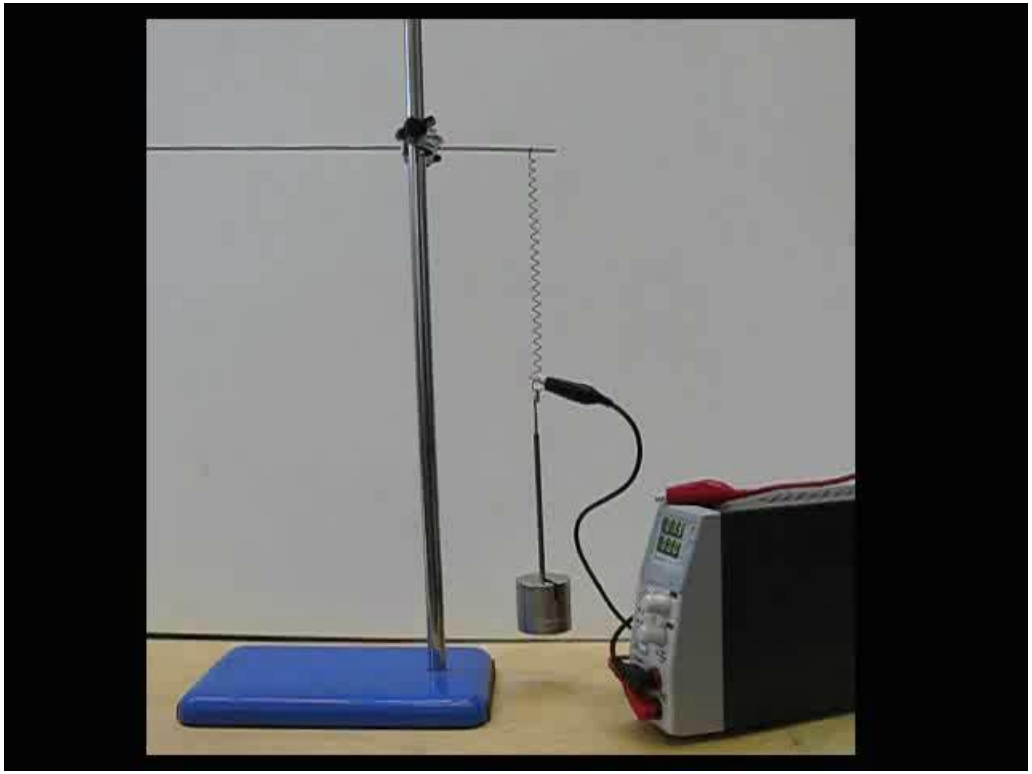
e.g. biomedical, water treatment, energy, construction etc.

David Huson, Peter Walters and Stephen Hoskins
Centre for Fine Print Research, building on AHRC funded research project

3D printing and smart materials

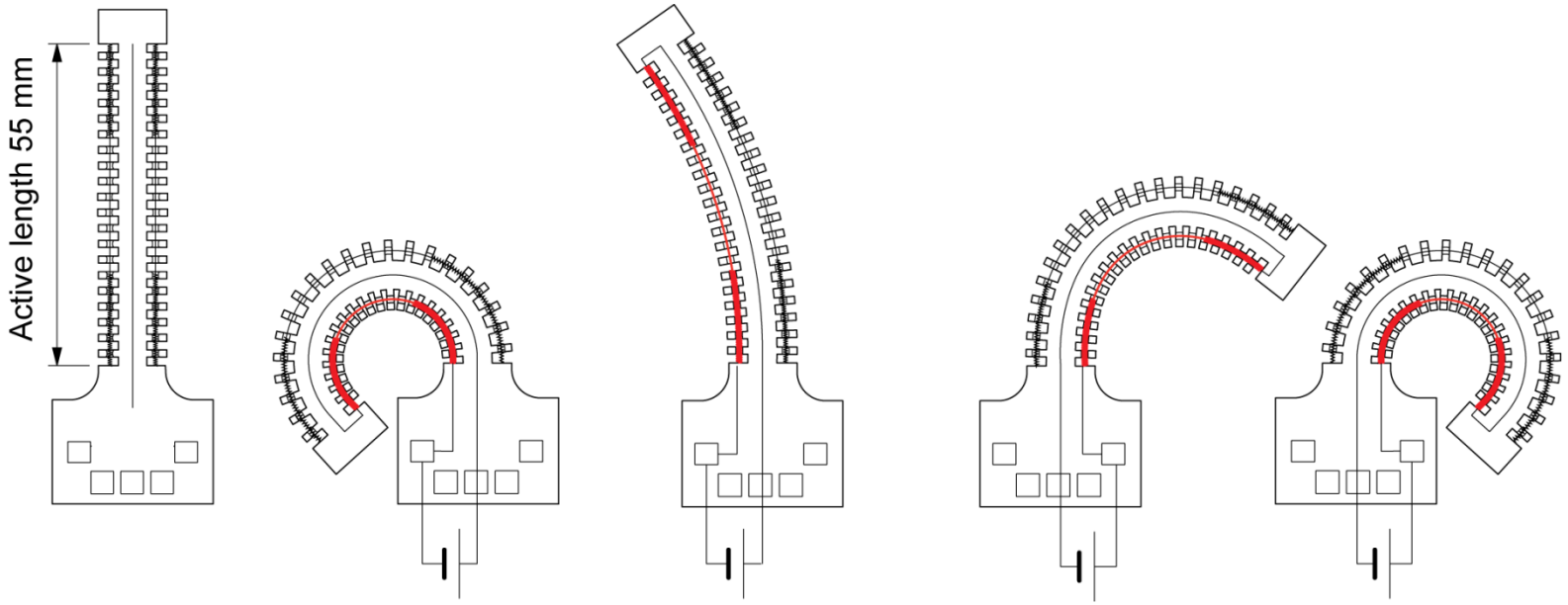
UWE early career grant

Peter Walters and David McGoran



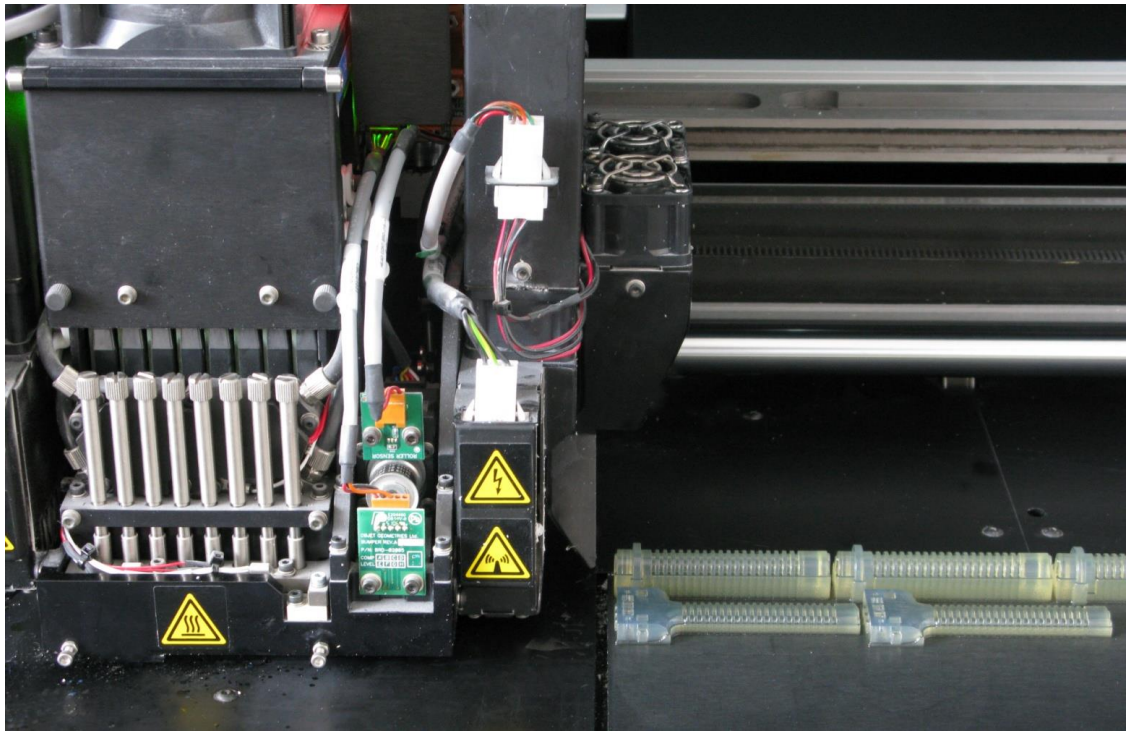
Ni Ti Shape memory alloy artificial muscle

Helical structure contracts when heated by electric current



3D printed tentacle-like active structure

Toki Biometal Helix actuator contracts like a muscle (typ. 4.5v)



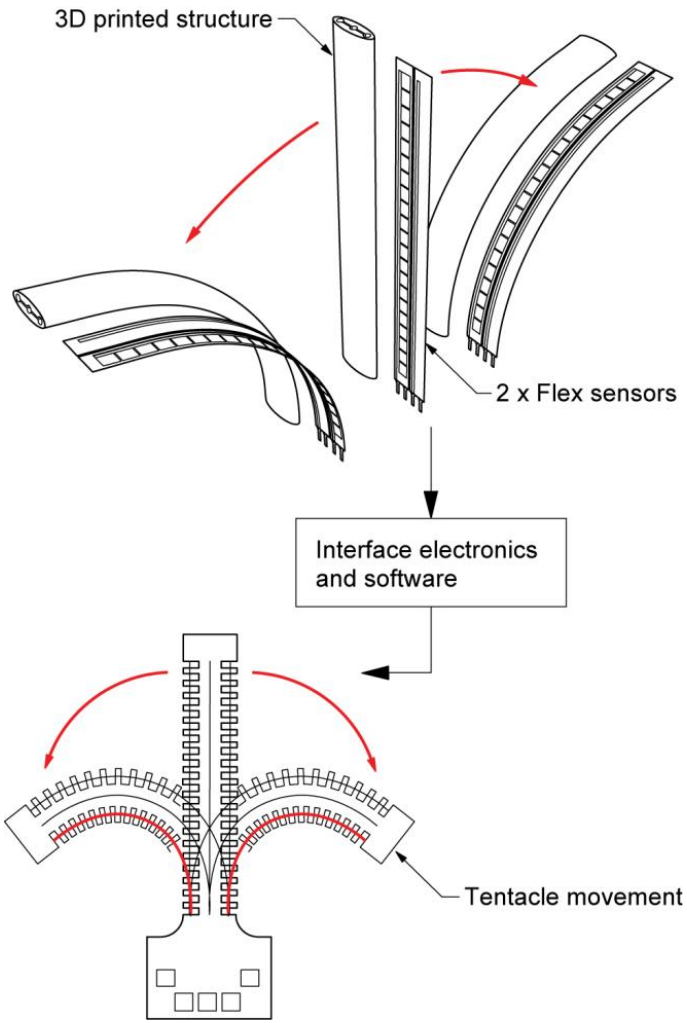
3D printing tentacle structures

Objet Geometries EDEN 350 V

Tango Plus uv-cure elastomer

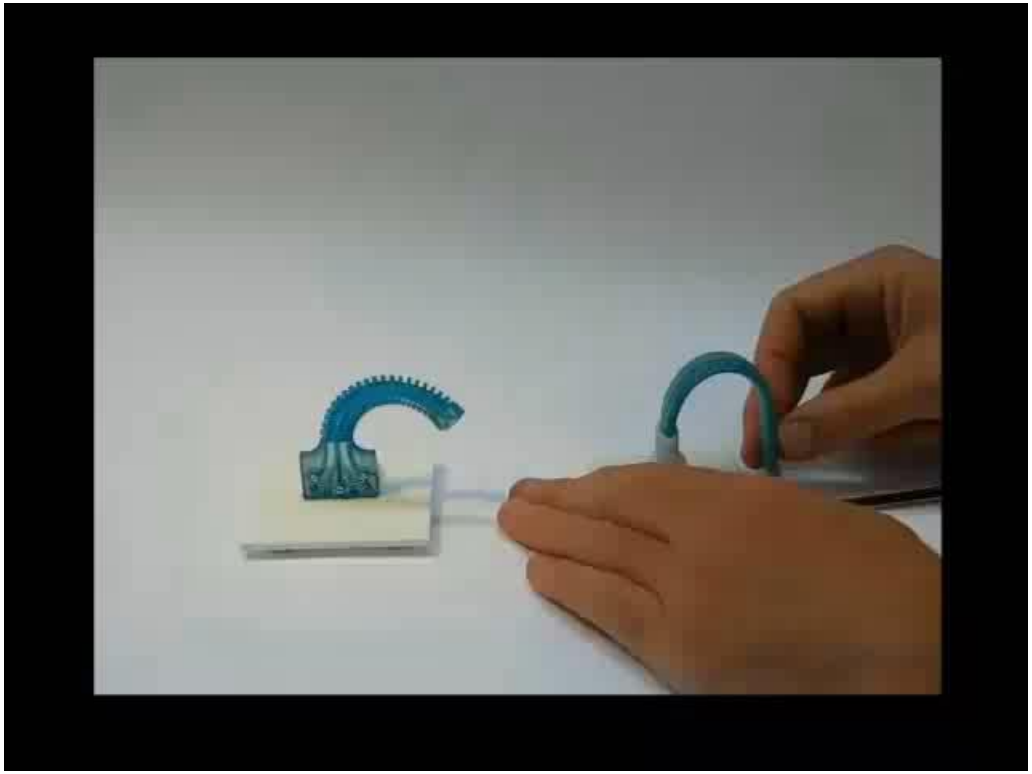
3D printed soft rubber-like structures

3D printed tentacle structure
NiTi actuation – Biometal Helix



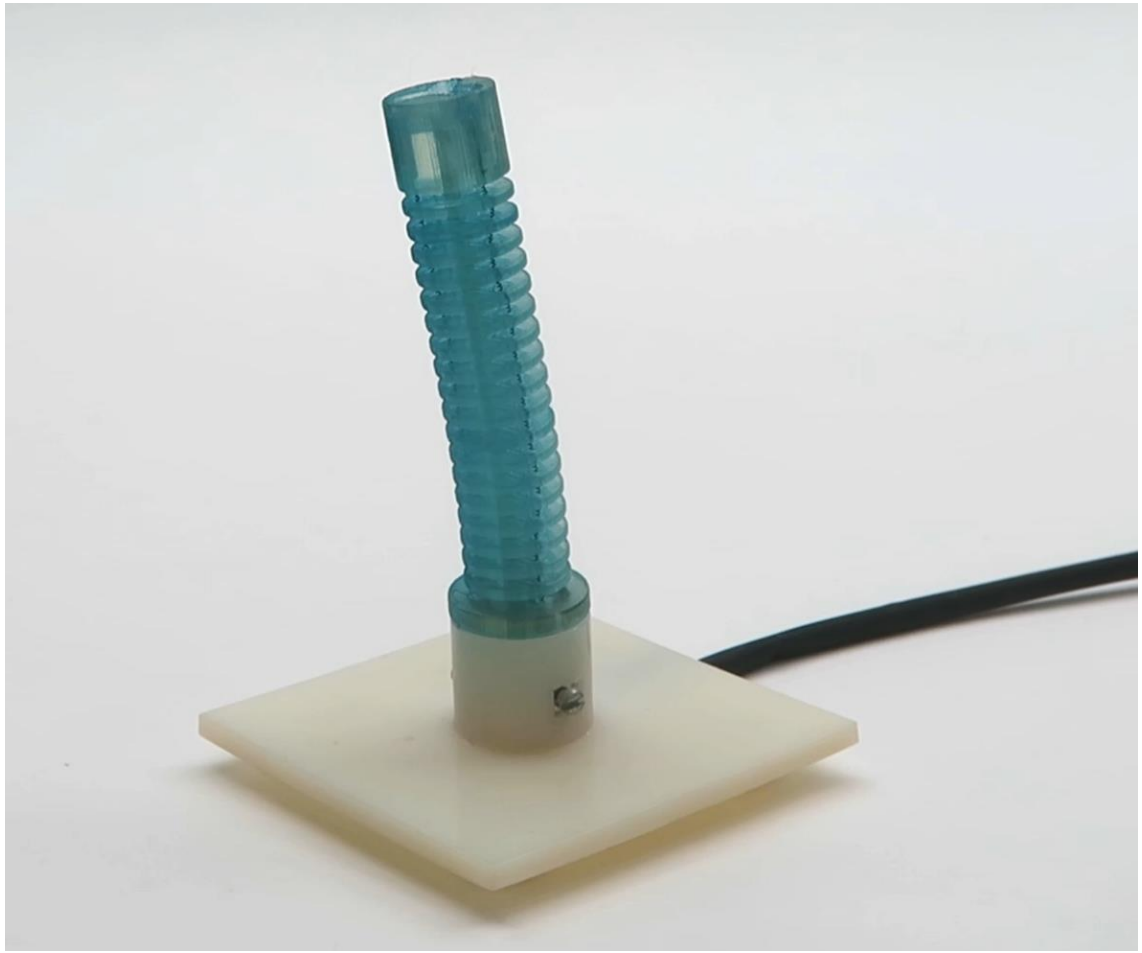
Tentacle “smart puppet” with flex sensor control

2 x resistive flex sensors, Arduino microcontroller, dual MOSFET driver, open loop control



Tentacle “smart puppet” with flex sensor control

4D printing – lifelike, silent movement



Peter Walters and David McGoran
Centre for Fine Print Research




Thank you!

Peter2.Walters@uwe.ac.uk

UWE Bristol

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