Peter Walters

Smart materials and novel actuators: Creative applications in art and design

Centre for Fine Print Research, University of the West of England
Centre for Fine Print Research, 3D printing in the visual arts and design

Trumpet Tiles and Trumpet Spheres (2009)
Peter Walters. Form and Colour Studies – Z-Corp 3D Prints
3D Virtual to 3D Physical >> Digital Fabrication

Photopolymer model made using the EnvisionTEC Perfactory rapid prototyping system

Photopolymer model made using the Objet Geometries PolyJet 3D printing system TangoPlus rubber-like resin
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 when heated electrically
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
Artificial heartbeat
Biologically-driven actuation - yeast and microbial fuel cells

With Dr Ioannis Ieropoulos, Bristol Robotics Laboratory
“3D-printed cyborg muscle produces artificial heartbeat”

Sandrine Ceurstemont, New Scientist TV, 21 Feb 2013
Thank you!

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Digital Fabrication of “Smart” Structures and Mechanisms: Creative Applications in Art and Design
Walters, Peter and McGoran, David, IS&T Digital Fabrication, Minneapolis 2011

Digital Fabrication of a Novel Bio-Actuator for Bio-Robotic Art and Design
Walters, P., Ieropoulos, I., McGoran, D., IS&T Digital Fabrication, Minneapolis 2011

3D Printing for Artists: Research and Creative Practice