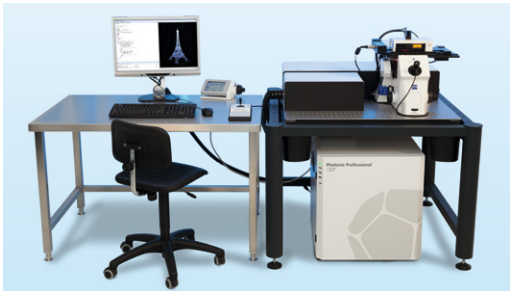
APPLICATION NOTE

nanoscribe

LIFE SCIENCES

Nanoscribe's Photonic Professional *GT* 3D printers allow to easily produce tailored and reproducible 3D scaffolds and matrices. Here, the tailoring is achieved by on one hand a wide range of processable materials and on the other hand a resolution and feature sizes which, in combination, allow to mimic in vivo physiological environments. Accessible patterning scales cover sub-micrometer features and sample volumes of up to several 10 mm³ at the same time. Samples can be produced from biocompatible, cell binding/repelling, hydrophobic and hydrophilic polymers with different mechanical characteristics as well as hydrogels.

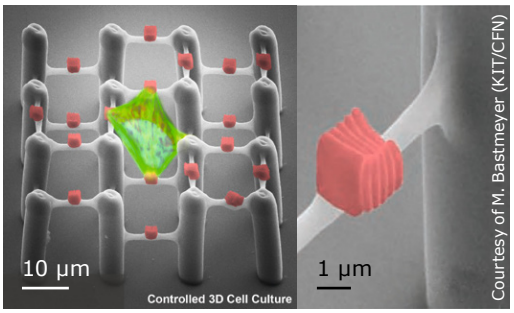


CELL / EXTRACELLULAR MATRIX INTERACTION

Challenge: Fabrication of a microstructured 3D cell scaffold consisting of a cell-repellent material (grey) and a cell adhesion promoting material (red) as per design.

Solution: First, a core scaffold made of PEG-DA mixed with PETA (grey) is additively printed. Then, a second printing step adds cell adhesion points made of OrmoComp (red) precisely at the designed locations.

Source: DOI: 10.1002/adma.201004060

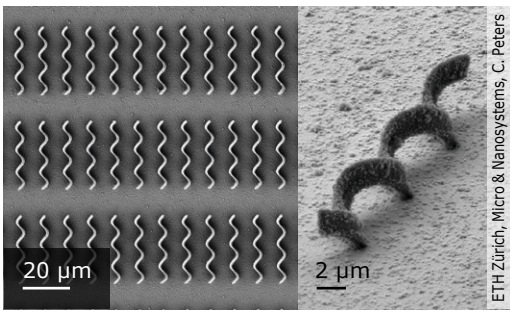


TARGETED DRUG DELIVERY

Challenge: One-step fabrication of cargo-loaded helical swimming microrobots made of biodegradable superparamagnetic hydrogel for minimal invasive intervention.

Solution: A hydrogel consisting of PEG-DA/PETA, magnetite nanoparticles and photoinitiator is 3D printed. For loading, the helices are immersed in methylene blue.

Source: DOI: 10.1002/adma.201503112

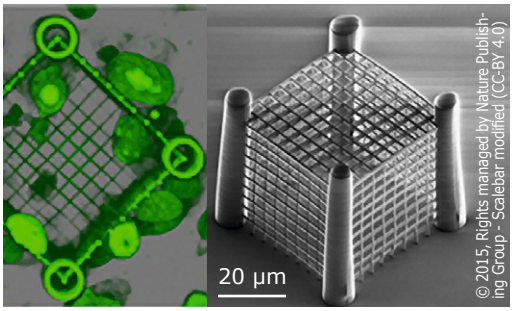


CELL MIGRATION

Challenge: Fabrication of cage-like 3D micro-structures with sufficiently small pore size to differentiate tumorigenic from non-tumorigenic human breast cancer cells based on different invasion behavior.

Solution: Cubic cages with meshes of approximately 3, 18 and 85 µm² pore size as side faces are printed in Nanoscribe's biocompatible photoresist IP-L 780.

Source: DOI: 10.1038/srep10531

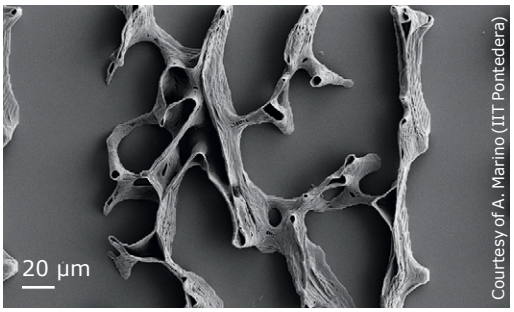


TISSUE ENGINEERING / 3D CELL CULTURE

Challenge: High-fidelity replication of a human trabecular bone structure from high resolution 3D data obtained from a µ-CT scan.

Solution: µ-CT data is transferred to the standard 3D printing workflow. The scanned 3D object is reproduced with sub-micrometer precision in OrmoComp.

Source: DOI: 10.1016/j.actbio.2014.05.032



Learn more about the world's highest resolution 3D printer
Photonic Professional GT

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