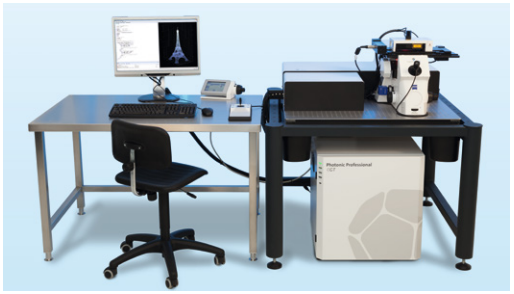
MICROROBOTICS

Nanoscribe's 3D microprinter Photonic Professional *GT* allows for microfabrication with an intrinsic capacity to build complex and custom 3D micro tools. It enables the fabrication of microrobots that interact with tissue and single living cells and conduct medical tasks at the micro scale. Remotely controlled micromachines, which can be powered by magnetic, chemical or optical actuation, are crucial for minimal invasive operations. Depending on the desired actuation mechanism microrobots can be printed from photopolymers, nanoparticle composites as well as hydrogels. Metallic coatings can be applied if required.

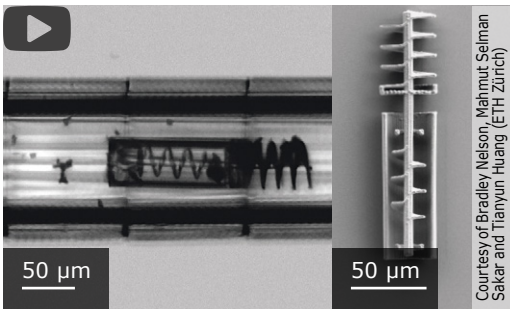


MICROTRANSPORTERS FOR TARGETED DRUG DELIVERY

Challenge: Controlled loading, transport and release of therapeutic agents in fluids by means of a microtransporter remotely actuated by a magnetic field that rotates a magnetic shaft.

Solution: The complete transporter is printed without further assembly. A sacrificial printed shell allows for selective coating of the structure with Ni/Ti.

Source: DOI: 10.1002/adma.201503095

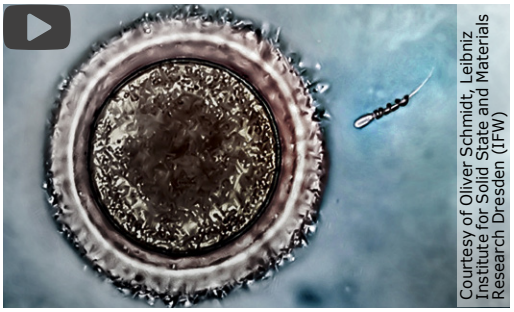


FERTILIZATION-ASSISTING MICROMOTORS

Challenge: Cell-compatible micromachine able to catch, transport and release living sperm to an oocyte overcoming low sperm motility-induced fertility issues.

Solution: Printed polymer microhelices are coated with nickel and titanium allowing the helices to act as motors in a magnetic field and providing biocompatibility, respectively.

Source: DOI: 10.1021/acs.nanolett.5b04221

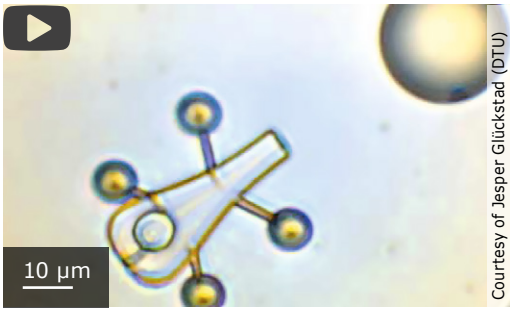


OPTICAL MICROSYRINGE

Challenge: Micro tool capable of movement with six degrees of freedom and controlled as well as precise cargo loading, transport and release.

Solution: A hollow micro vessel with several trapping handles is printed and moved by optical tweezing. Optically changing the pressure inside the vessel allows for loading and unloading of particles.

Source: DOI: 10.1038/lsa.2016.148

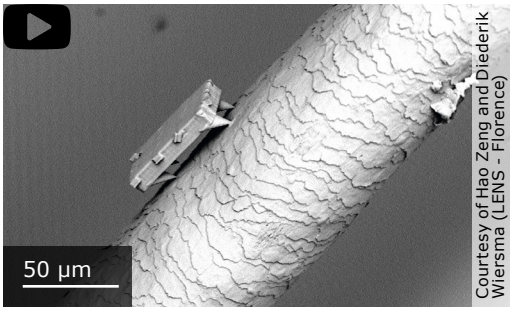


LIQUID CRYSTAL ELASTOMER (LCE) MICROWALKER

Challenge: Soft microrobot that reversibly deforms and is powered by light for walking and jumping, overcoming strong surface adhesion.

Solution: Conical legs are printed on a previously printed LCE structure to reduce adhesion. Modulated laser light contracts the robot body, changing the tilt of the legs leading to locomotion.

Source: DOI: 10.1002/adma.201501446



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

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