MagnebotiX AG is a spin-off of the Multiscale Robotics Lab of the ETH Zurich, founded in 2014.

We develop magnetic manipulation systems for high precision control of micro-objects to perform delicate tasks at scales of cells to humans. Our patented products drive ground-breaking research and enable unique processes in nanorobotics, biology and medicine.

Who we are - the Founders

Prof Brad Nelson,
MSRL ETH Zurich

Prof Simone Schuerle,
RBSL ETH Zurich

Dr. David Sargent,
CEO MagnebotiX AG

Magnetic MAGIC for Medicine

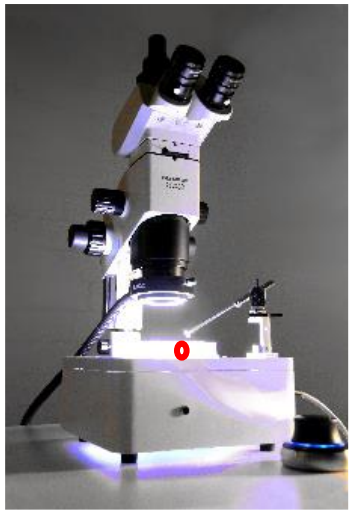
Magnetic manipulation – works remotely, can control both position and orientation (5 DOF), is not harmful to biological systems.

Our systems are used for

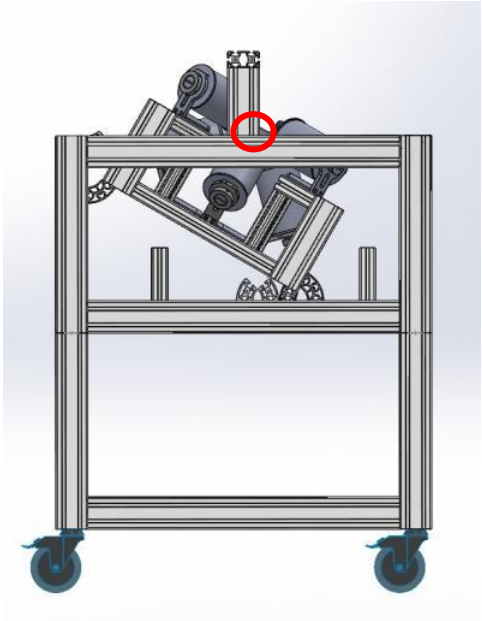
- **The study of the mechanobiology of membranes, cells, tissues**
- **the development of microsurgical procedures**
- **the manipulation of delicate micro-objects**
- **targeted drug delivery**

Our products

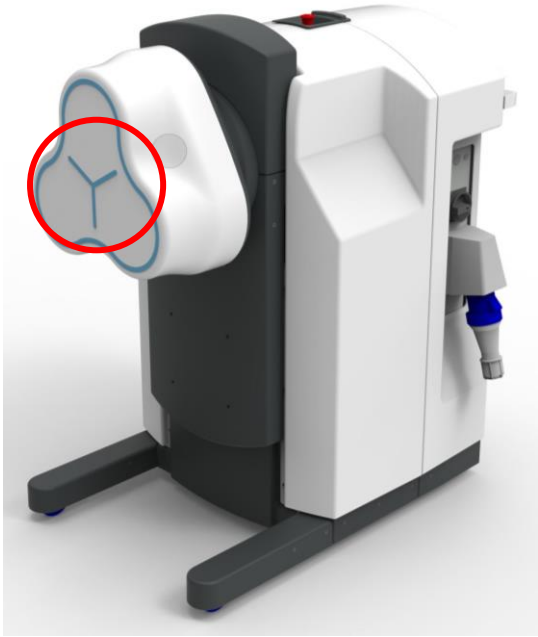
MFG-100 – the MiniMag



The OctoMag

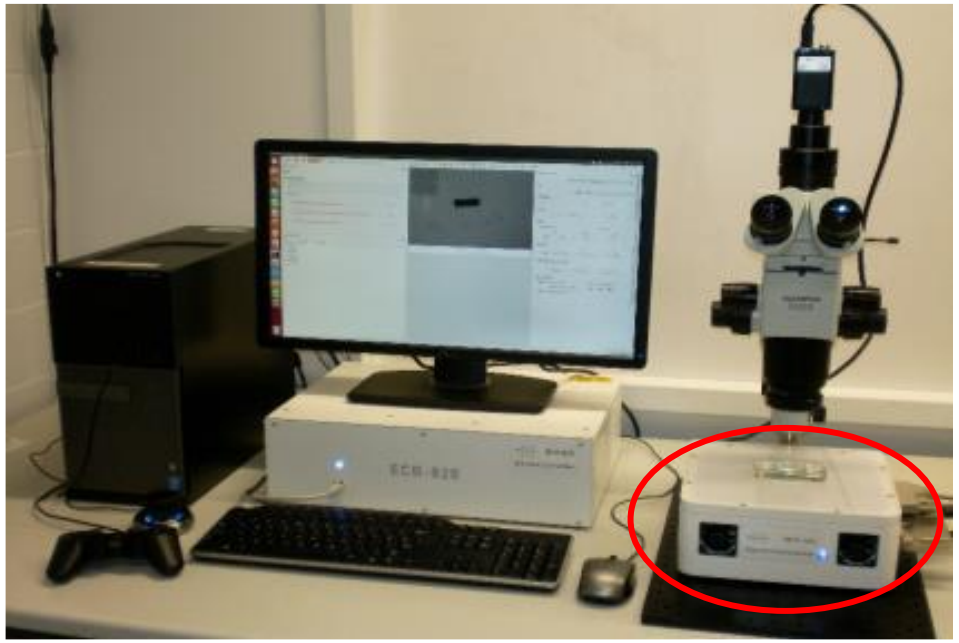


The Navion

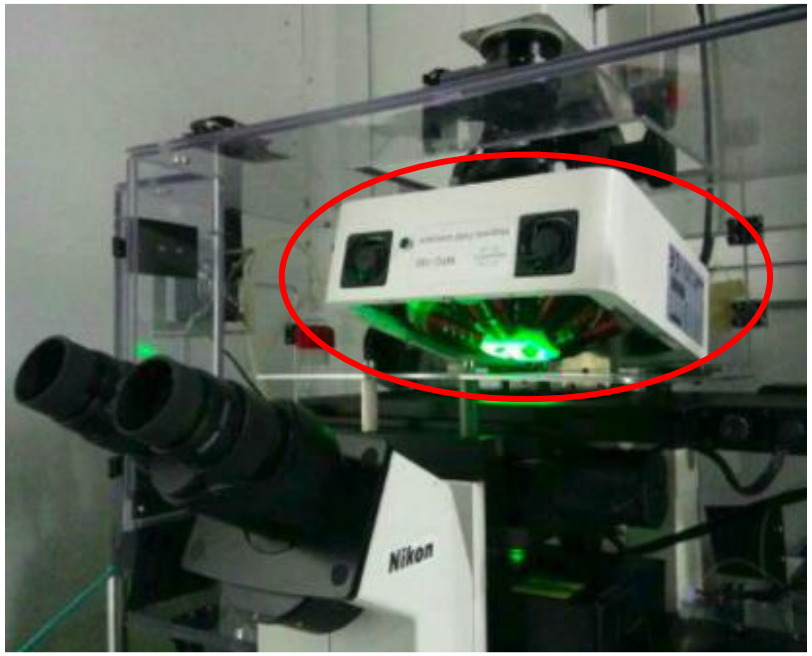


The MiniMag – for cells, microfluidics and tissues

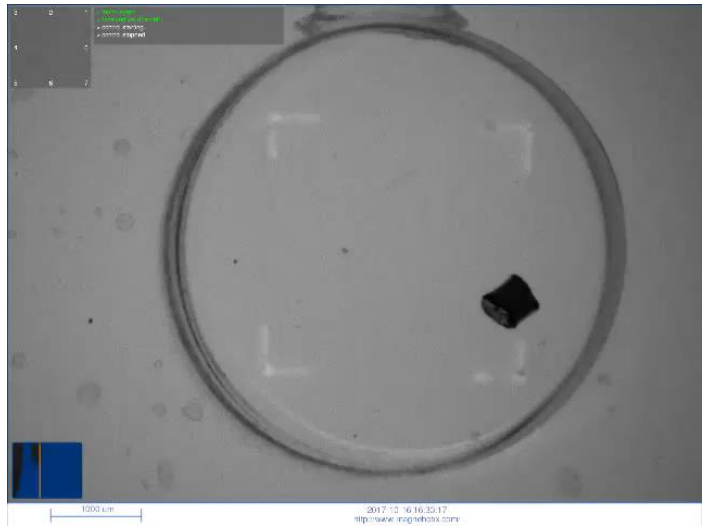
MFG-100 under an upright microscope



MFG-100-i on a higher magnification inverted microscope (mechanobiology)

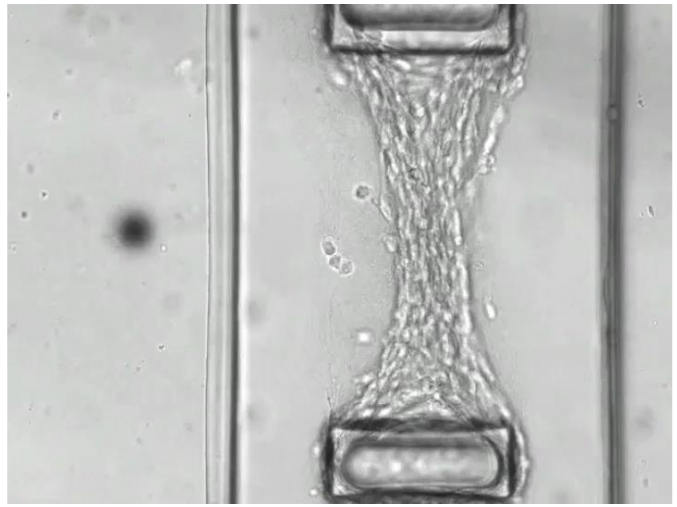


Remote, non-contact control of magnetic micro-particles using visual feedback



Magnetic particles can be controlled with micrometer precision…

a 1/4mm magnet in a dish

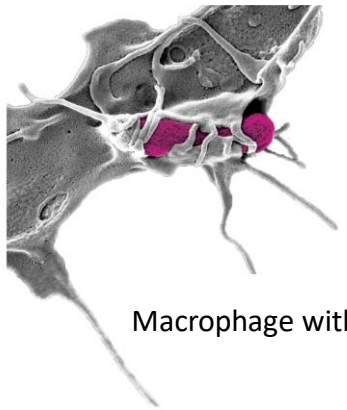


… for non-contact manipulation in 3 dimensions

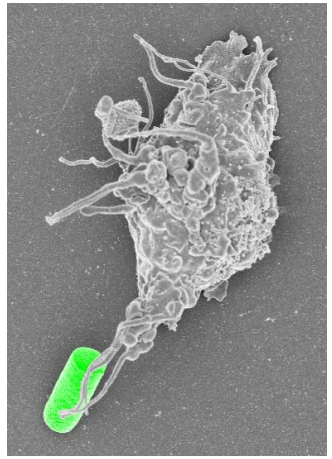
access all sides of a suspended microtissue

Single cell studies fpr mechanobiology or targeted drug delivery

Probing the immune response with a magnetic prey

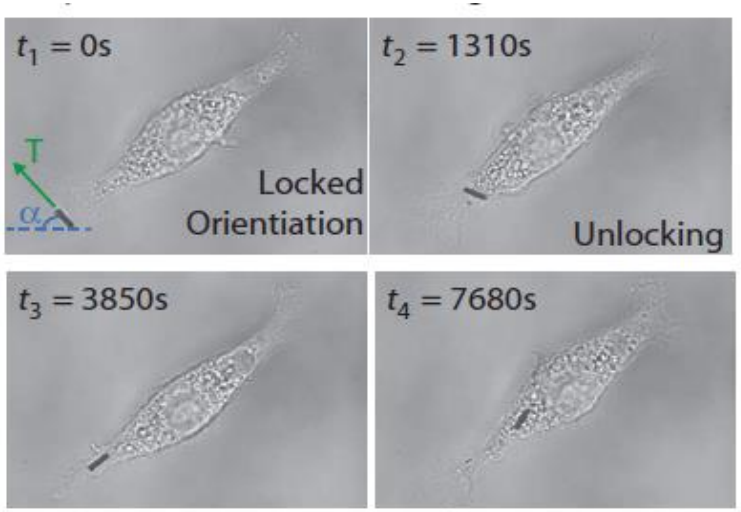


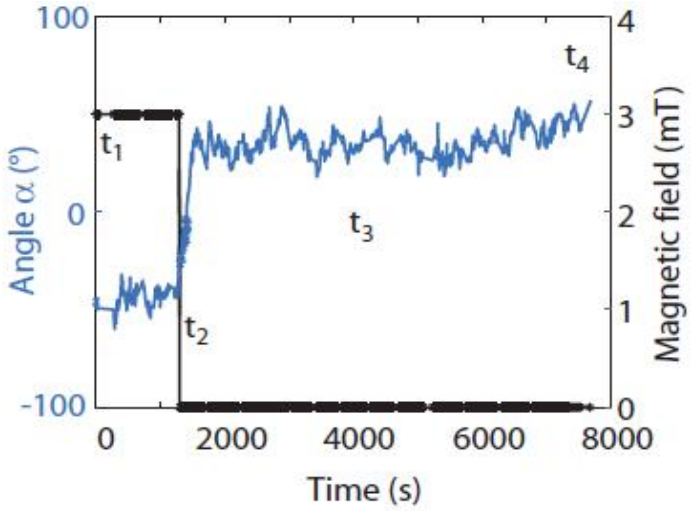
Macrophage with bacterium*



Macrophage with magnetic prey*

Magnetic prey in action*





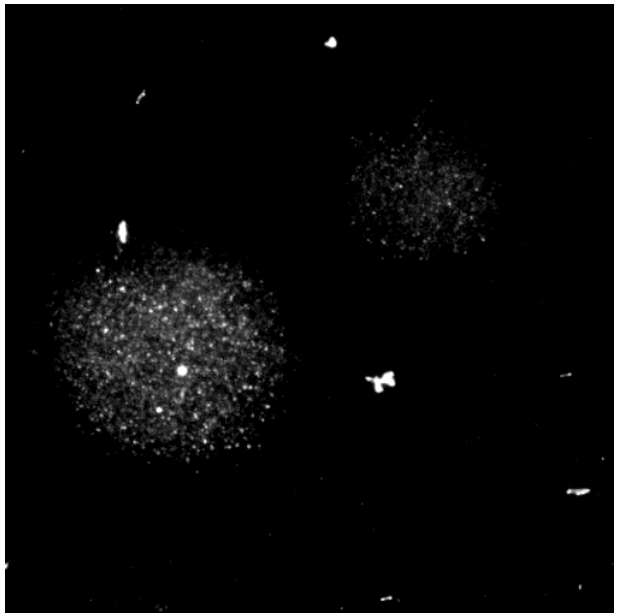
A magnetic micropillar (length 7um, diam. 2um) with adsorbed IgG to mimic a bacterium is guided to a macrophage. When the micropillar is magnetically restrained perpendicular to the phagocyte axis the attack is very slow. When the orientation clamp on the pillar is released the phagocyte quickly rotates it to be parallel to the cell axis and endocytosis ensues.

**Image provided by Dr. Avalos and Dr. Gerber*

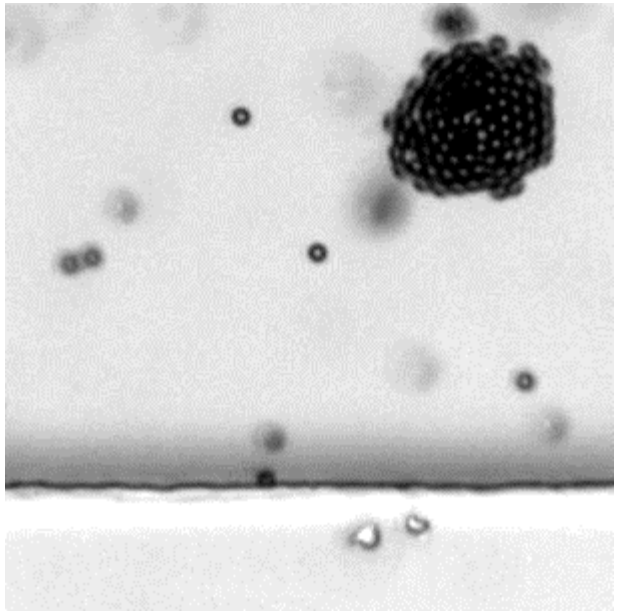
Schuerle, al., Science Robotics, 2017.

Targeted cargo delivery with combined acoustic and magnetic control:

Magnetically induced clumping in a channel



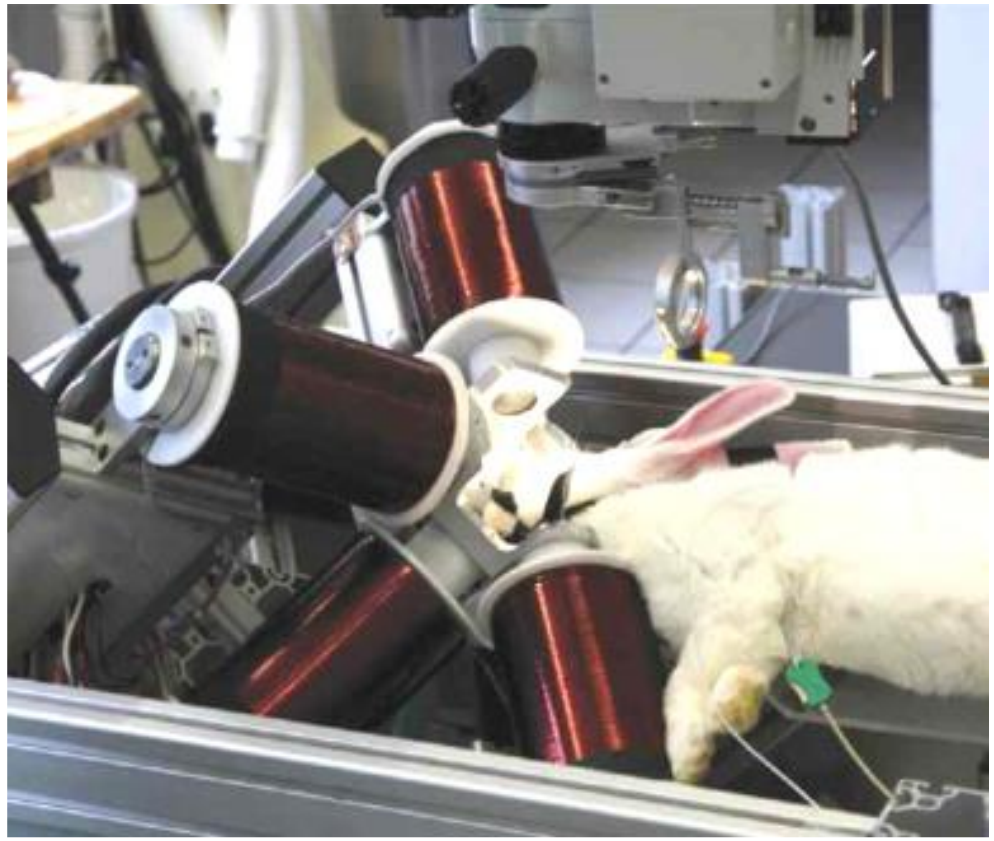
Acoustic guidance to the wall and combined induction of transport – even upstream



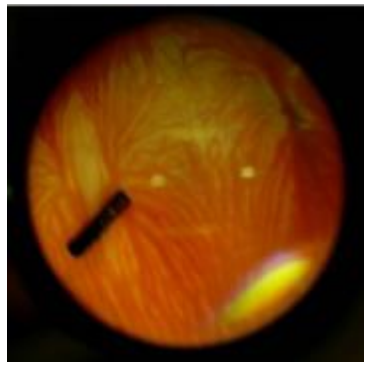
Note: related to M-ERA project “nanoPD”

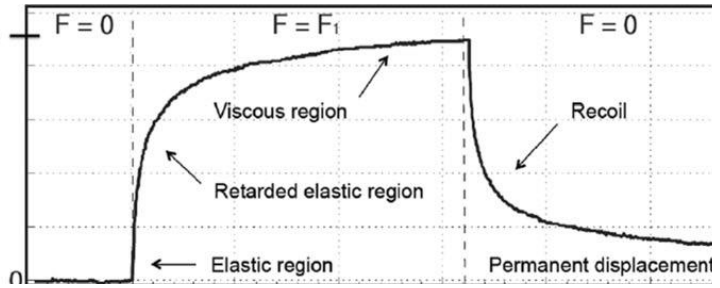
The OctoMag – for tissues, organs and small animals

Studies of the eye



Non-contact rheology in a rabbit eye with injected magnetic micro-particle (L = 1.8mm) for characterization of the vitreous humour (viewed through the retina)

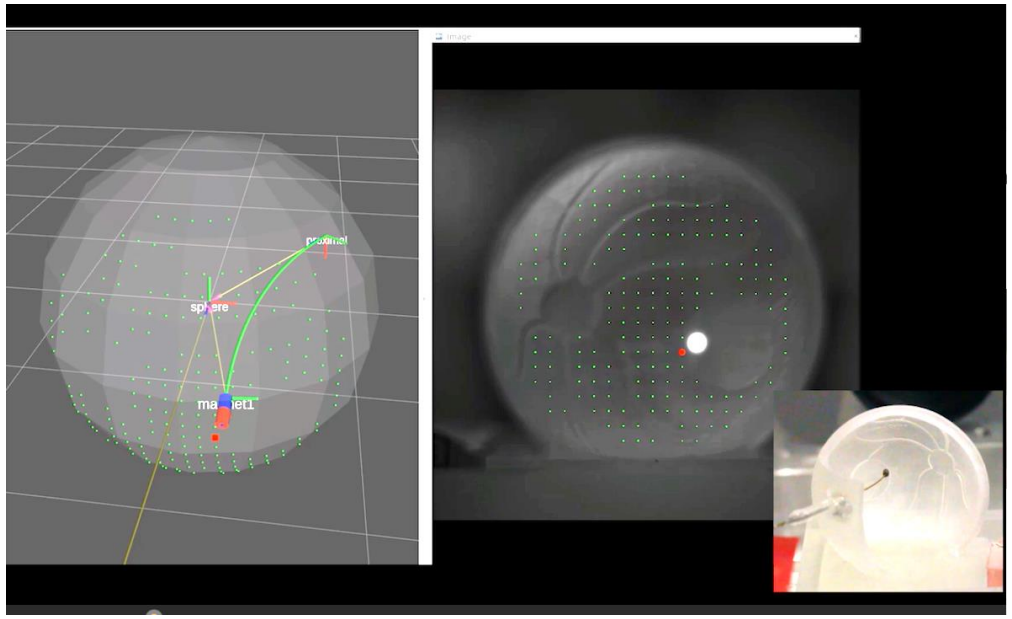




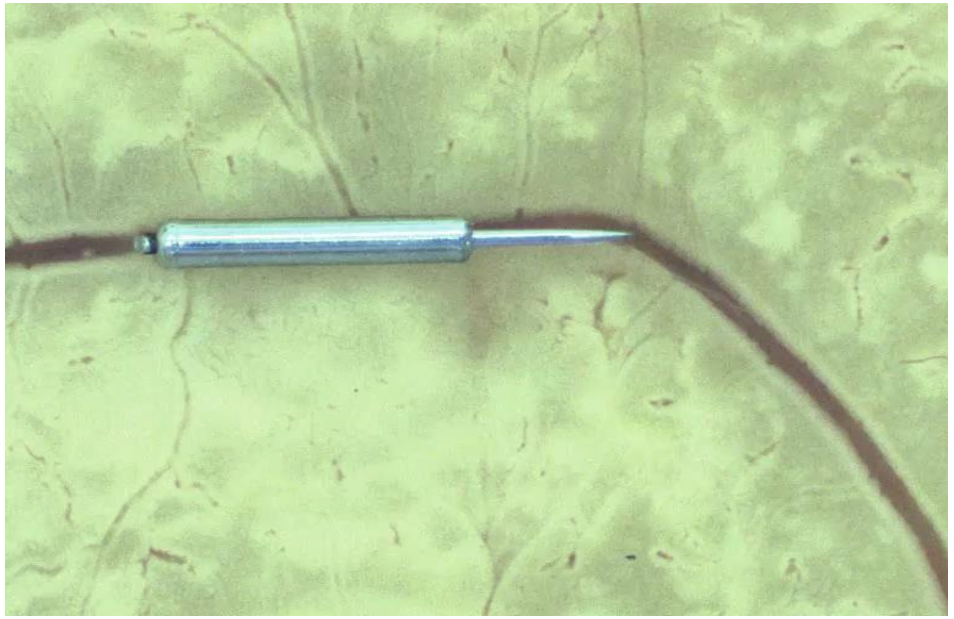
Ref.: Pokki etal., Biomed. Microdev. 2015

Micromanipulation in medicine

Micro-surgery in the eye

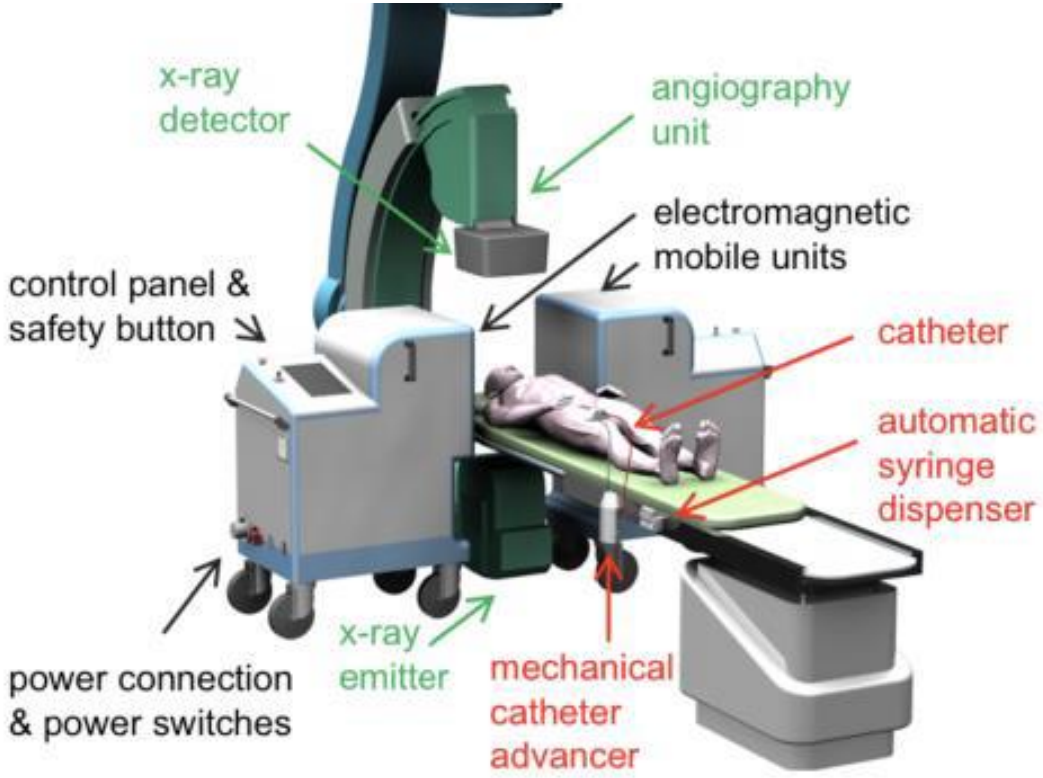


The magnetic field of the OctoMag is used to aim an optical fiber for retinal re-attachment in a mockup of an eye



A small magnet is steered to the retina, interacts with a small artery, and is retracted.

The MBX-Navion – for full-scale medical research



A touch of M*A*G*I*C …

Magnetic Actuation Generates Innovative Concepts

… brought to you by our great team of engineers and interns

The MagnebotiX story – we're building the future of magnetic actuation

Our thanks for support of research projects to the ETH Zurich, Innosuisse (mechanobiology), M-ERA.net (nanoPD) and H2020 (ANGIE)

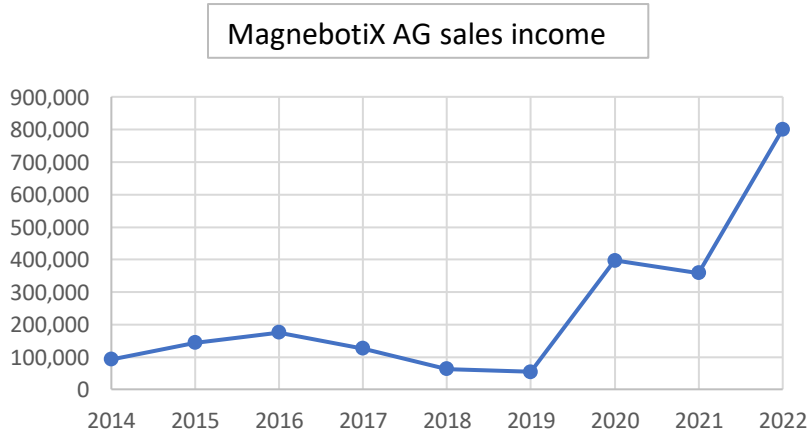
ETH
Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich

MSRL
Multi-Scale Robotics Lab

Innosuisse

M-era.Net

ANGIE
THE FUTURE OF DRUG DELIVERY



It's time to come aboard! Visit www.magnebotix.com