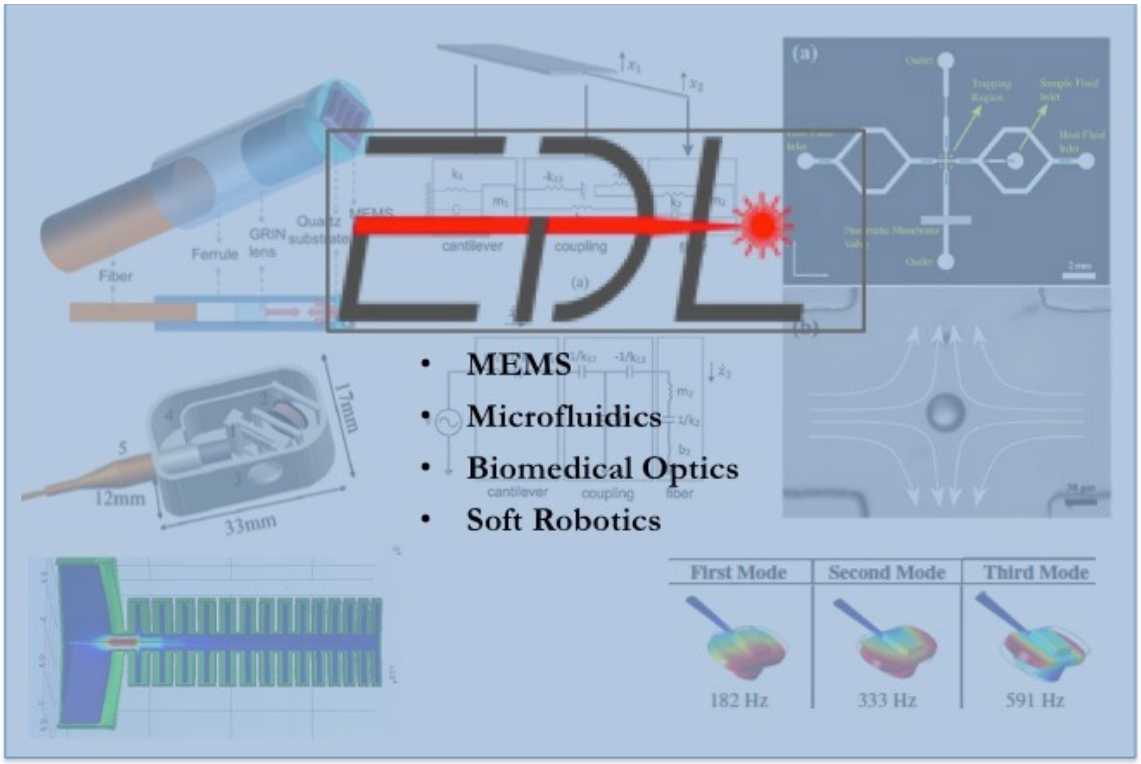
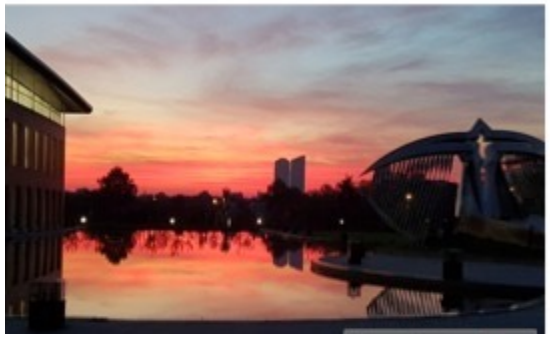
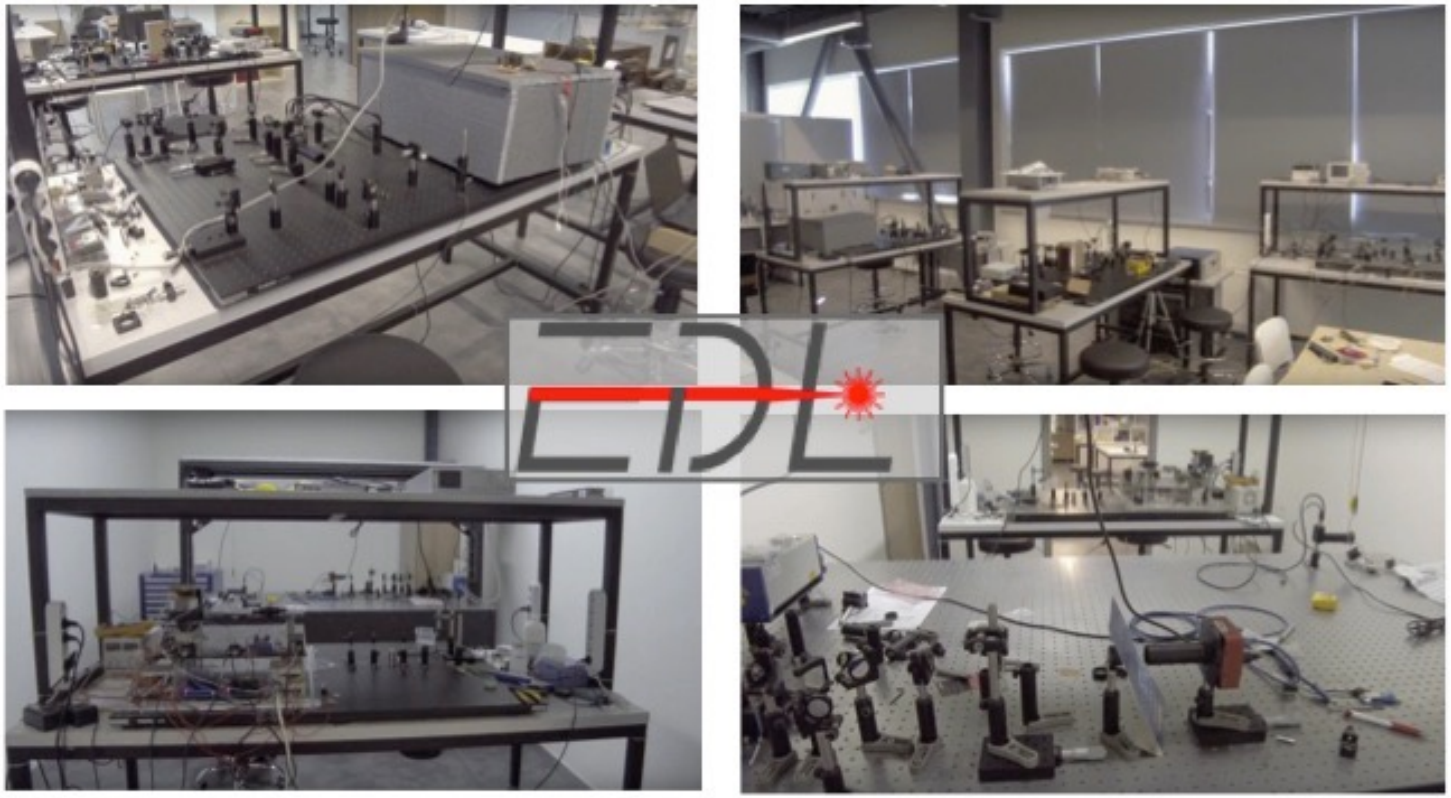
MATLAB in Biomedical Optics & MEMS





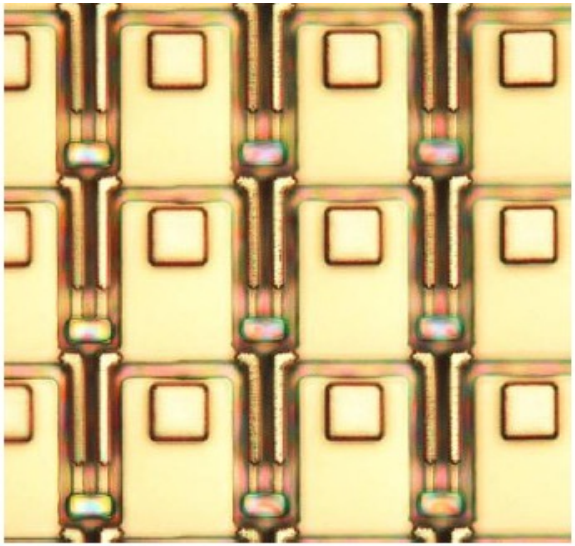
Assoc. Prof. *Onur Ferhanoğlu*
Istanbul Technical University

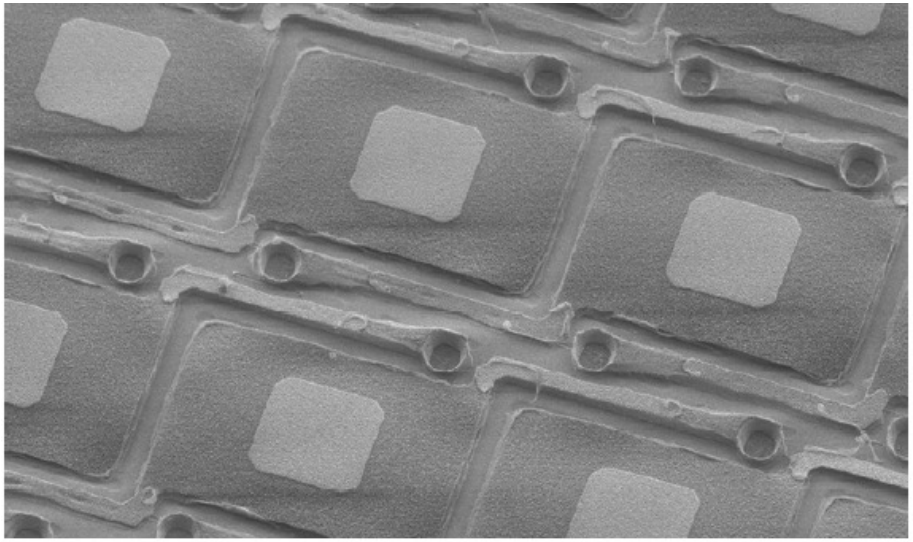
Part 1: The LAB

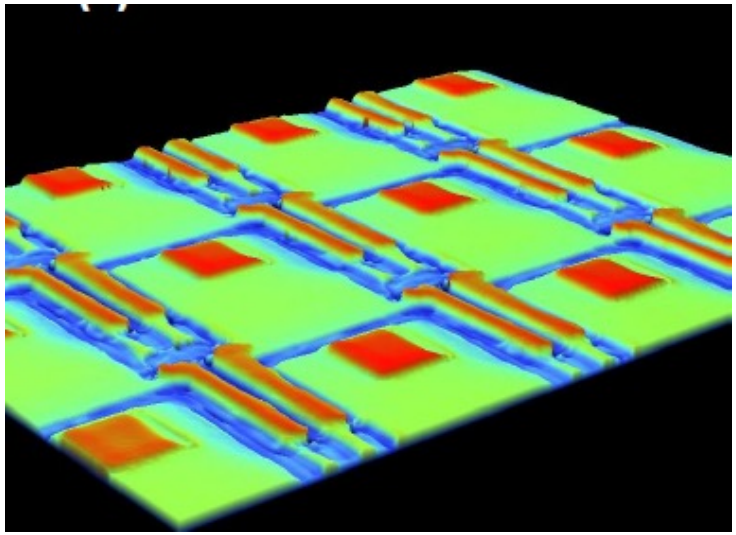


EDL Research Topics

- MEMS IR Sensor Arrays (Pre-ITU)



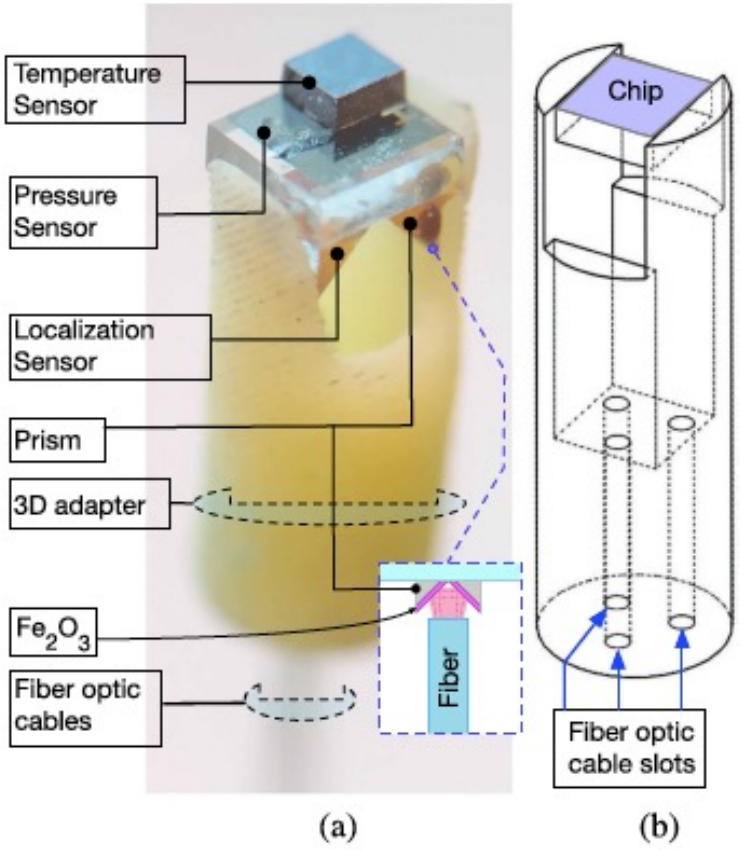


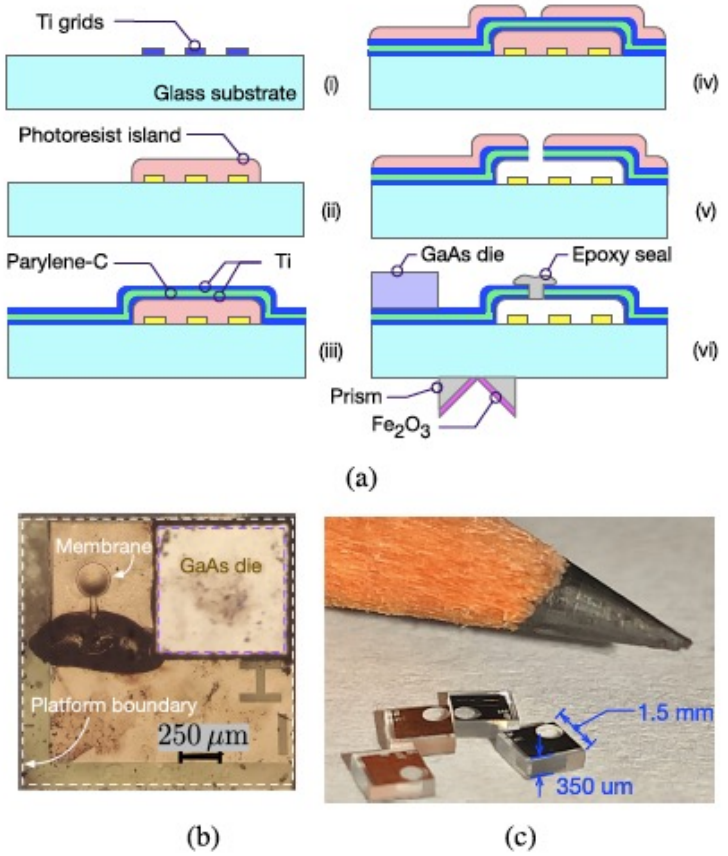


M.F. Toy et al, Sensors and Actuators, 2009

EDL Research Topics

- MEMS on Fiber Sensors (Pressure / Temperature / Location)

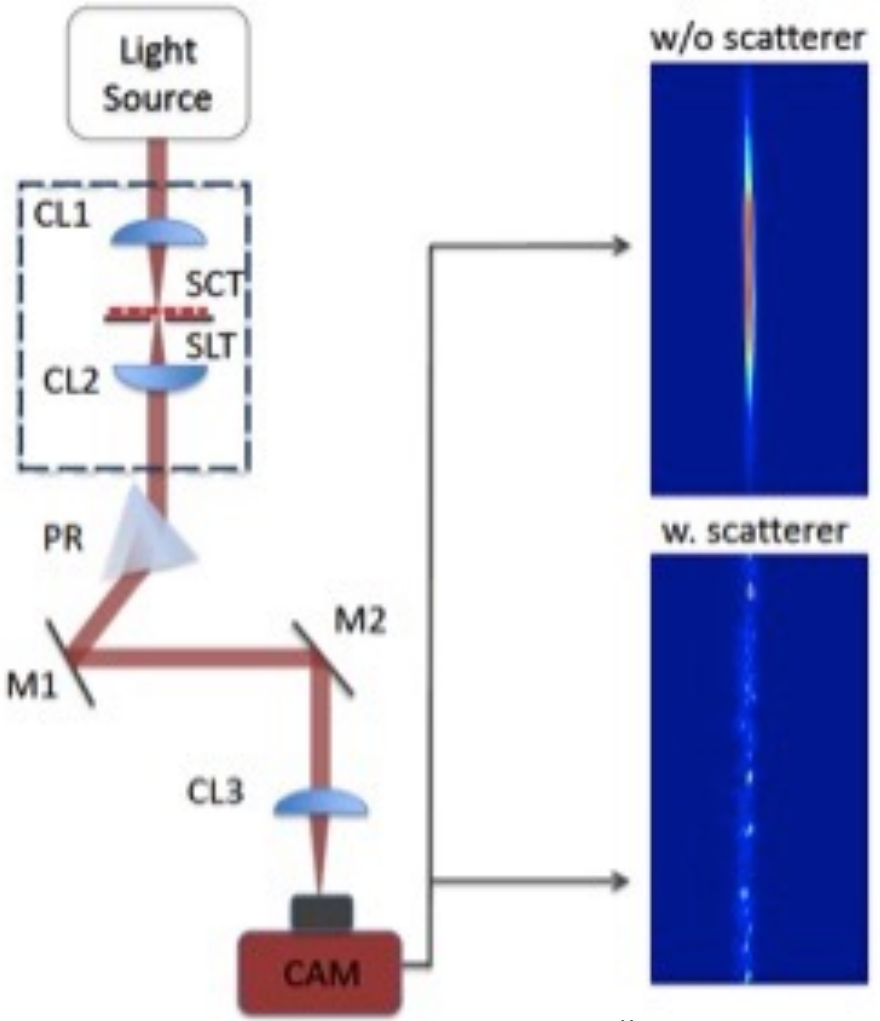




P. Zolfaghari et al, IEEE Journal of Lightwave Tech., 2021
P. Zolfaghari et al, Optics and Lasers in Eng, 2023

EDL Research Topics

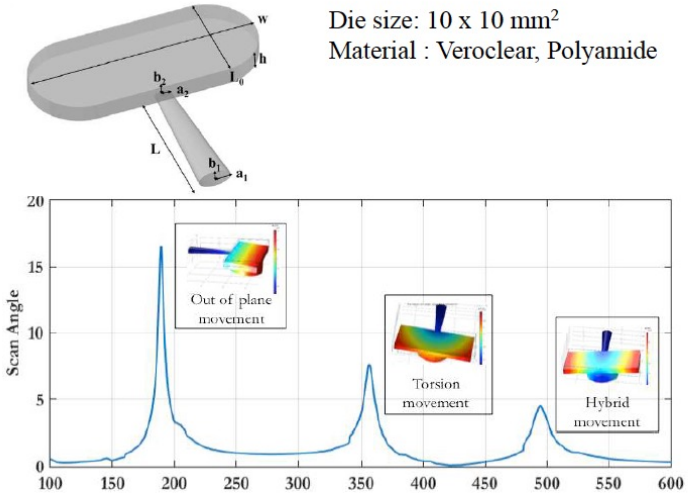
- High-Resolution Spectroscopy

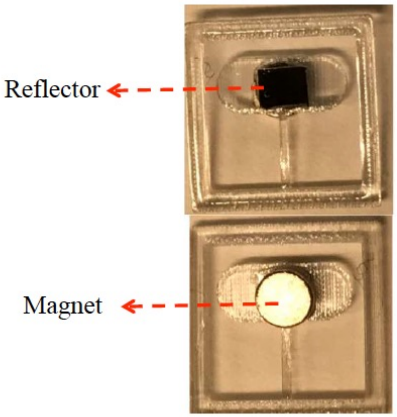


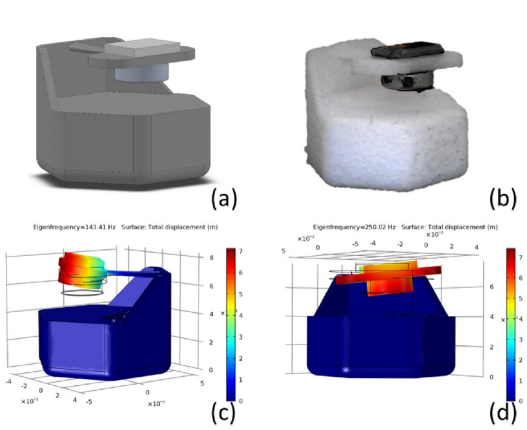
K. Çetindağ et al, IEEE PTL, 2018
K. Çetindağ et al, IEEE Journal of Lightwave Tech., 2020

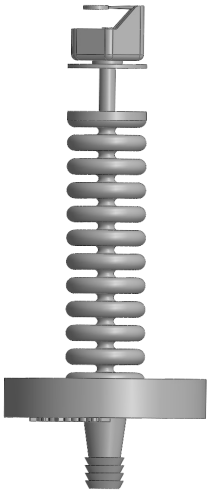
EDL Research Topics

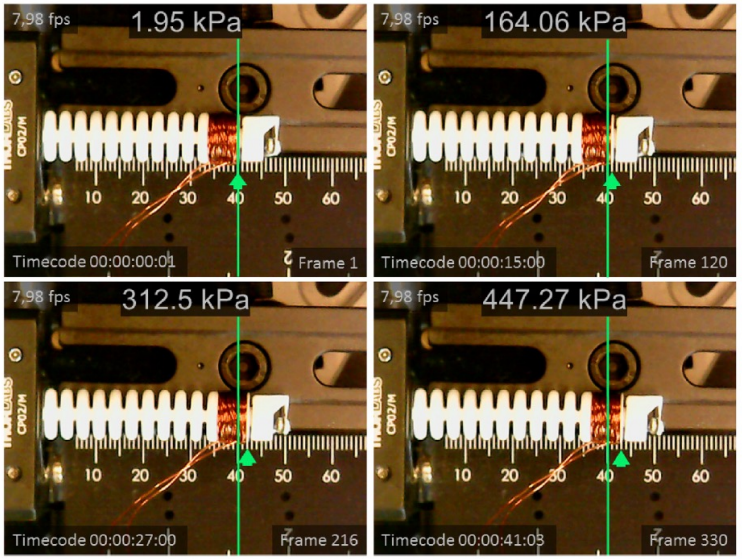
- 3D-Printed Actuators







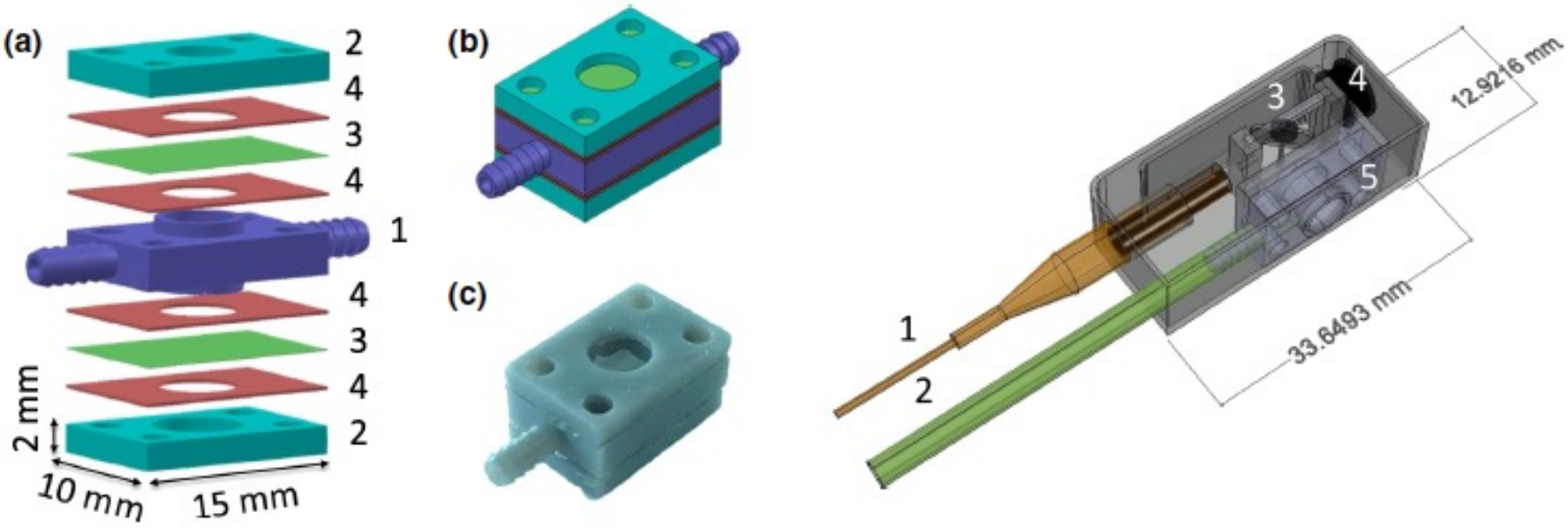




O Gürcüoğlu et al, Sensors and Actuators, 2021

EDL Research Topics

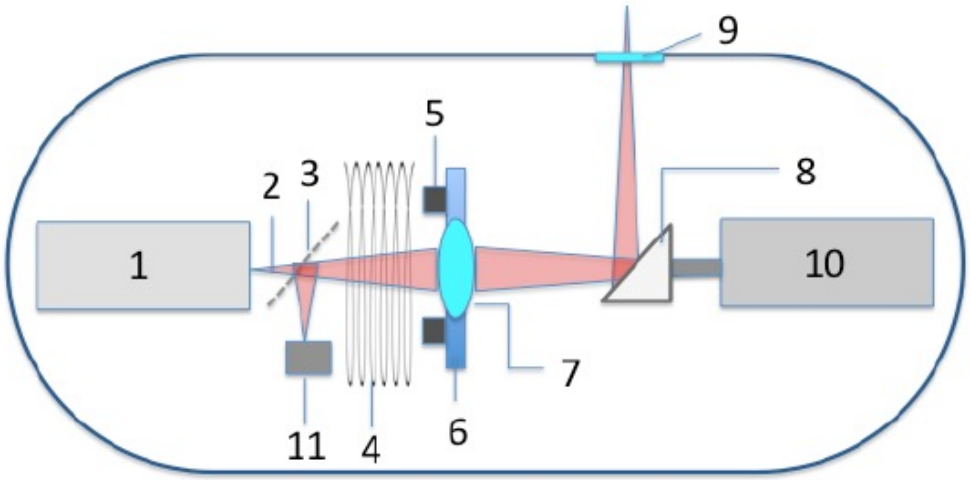
- 3D-Printed actuators

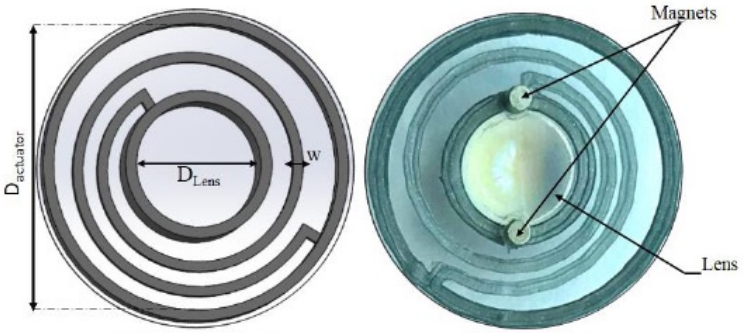


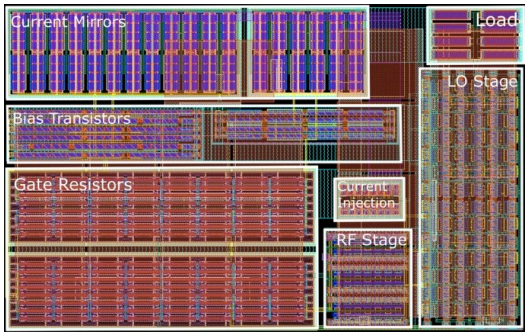
E. C. Senel et al, Microsystems Technology, 2020

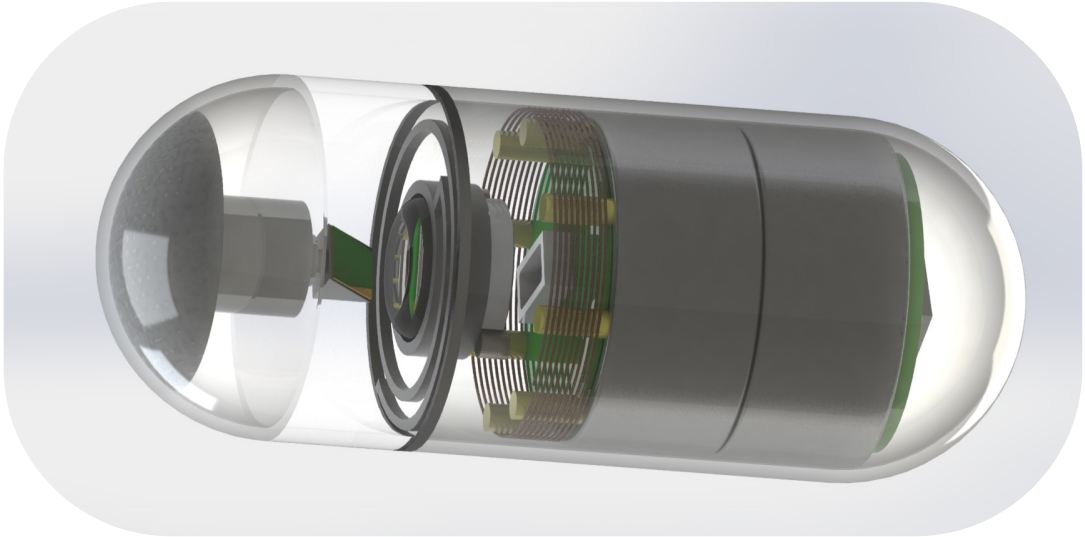
EDL Research Topics

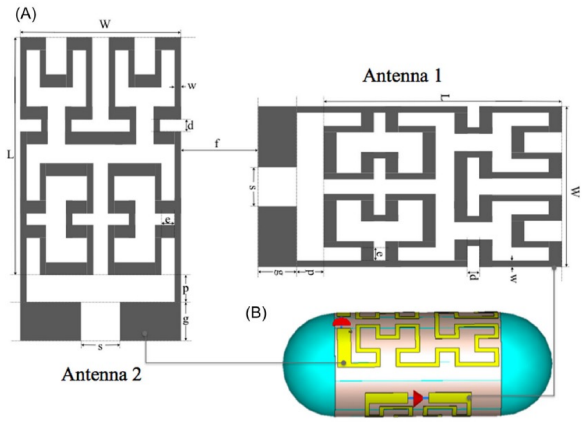
- Capsule Endoscopy











İ. S. Zöğ et al , Journal of Micromechanics and Microengineering, 2023

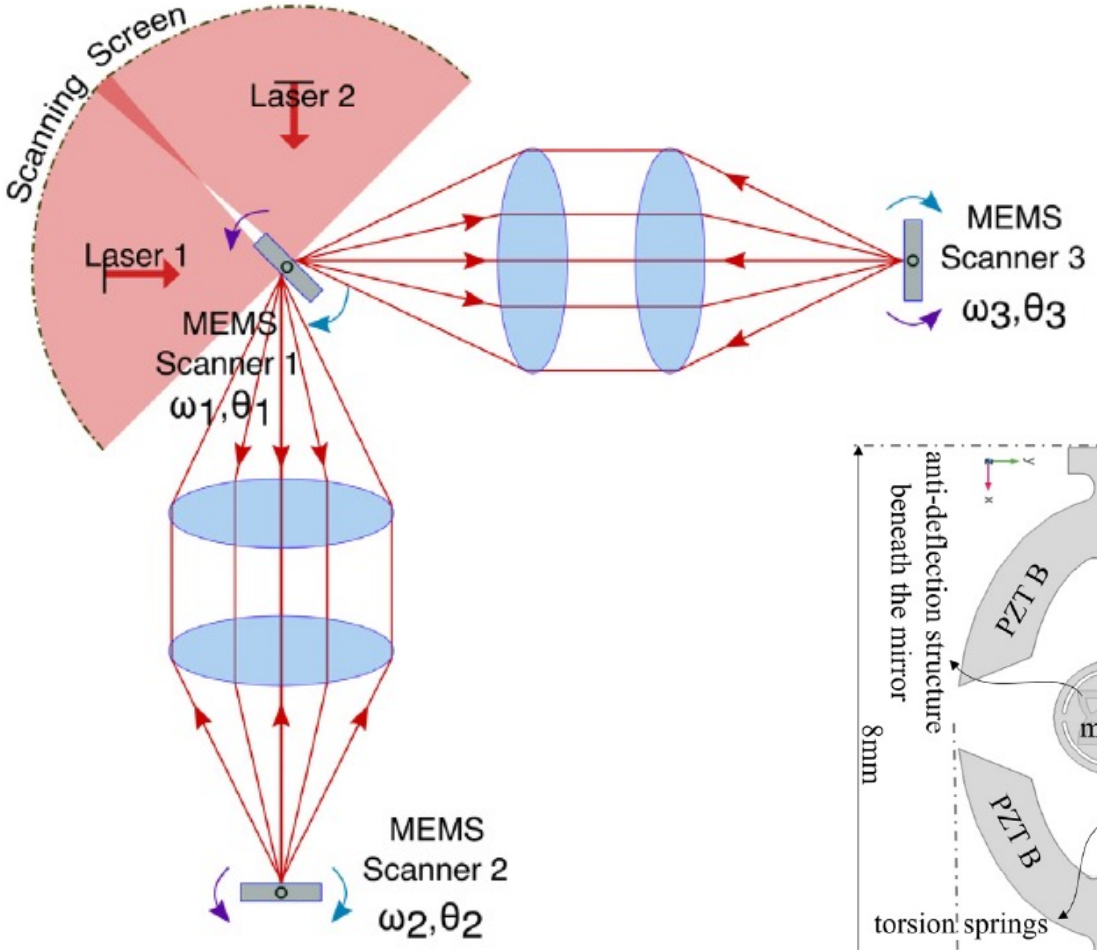
EDL Research Topics

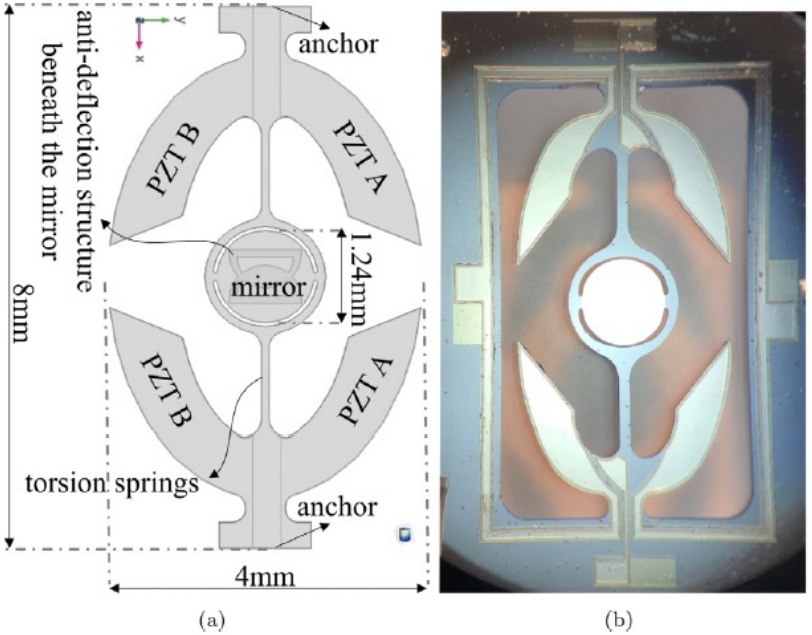
- Visible Light Communication

M.C. Erdem et al, Applied Optics, 2022

EDL Research Topics

- Cascaded MEMS Scanning for LIDAR

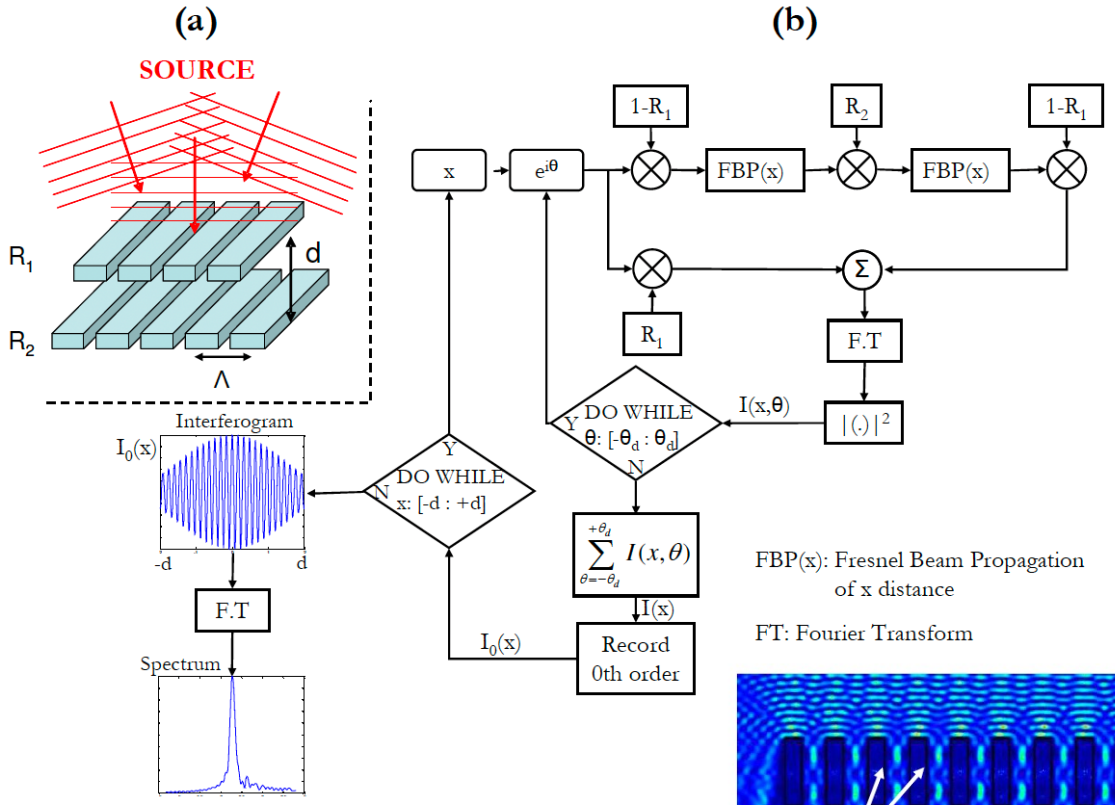


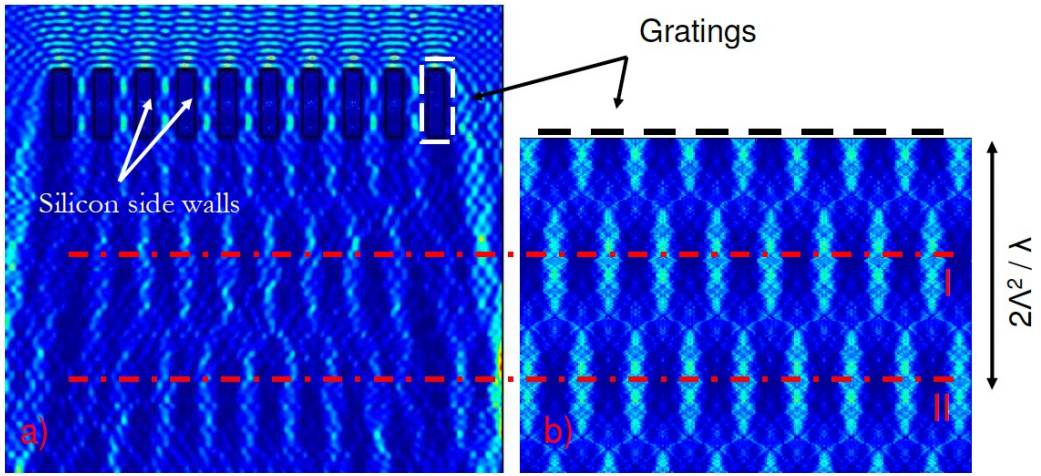


P. Zolfaghari et al, Optics and Laser Tech, 2024

Part 2: Utilization of MATLAB

- Light Beam Propagation (*Ferhanoğlu et al, 2009, Optics Express*)

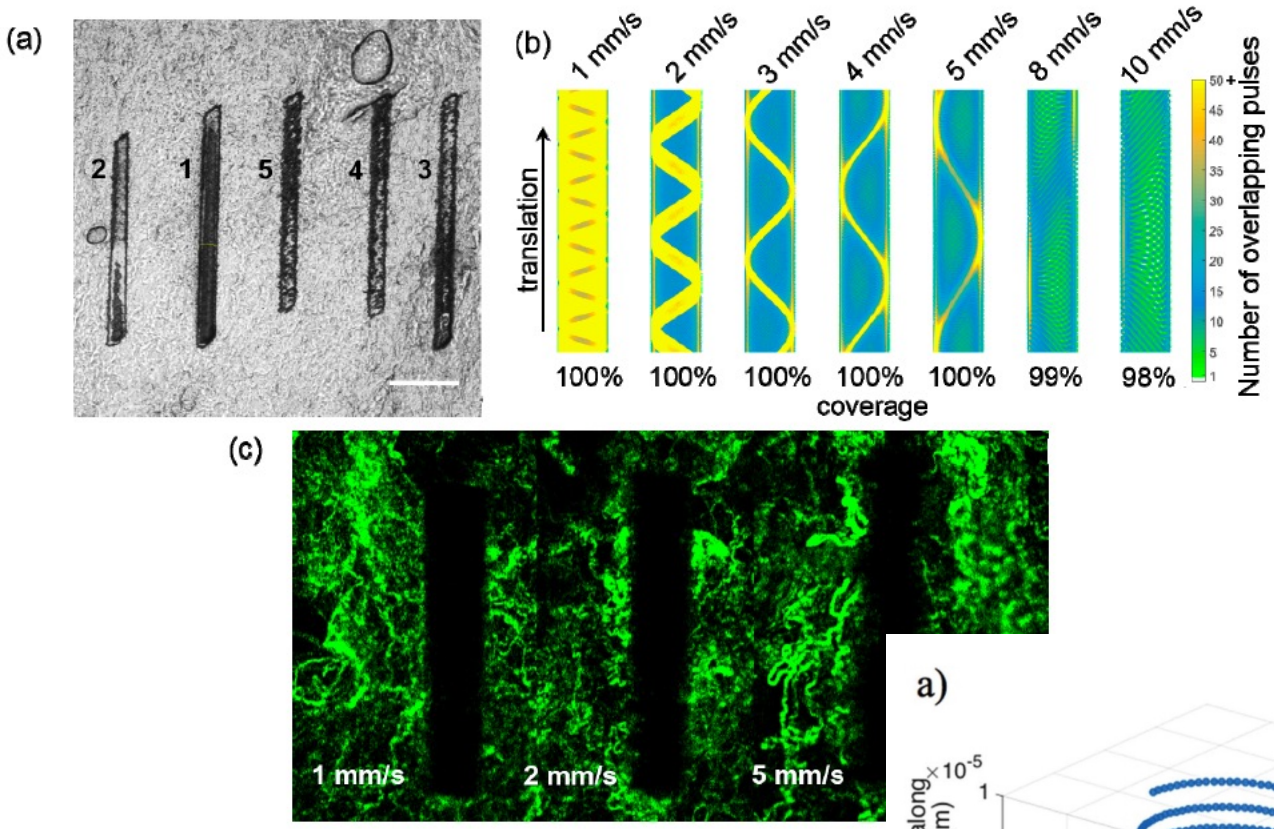


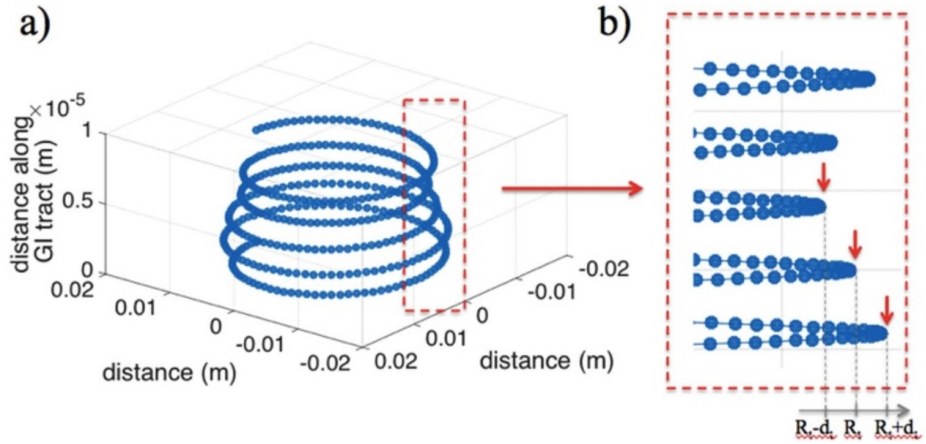


Ferhanoğlu et al, Optics Express. 2009

Part 2: Utilization of MATLAB

- *Scan Pattern Visualization of Pulsed Laser Scalpels*

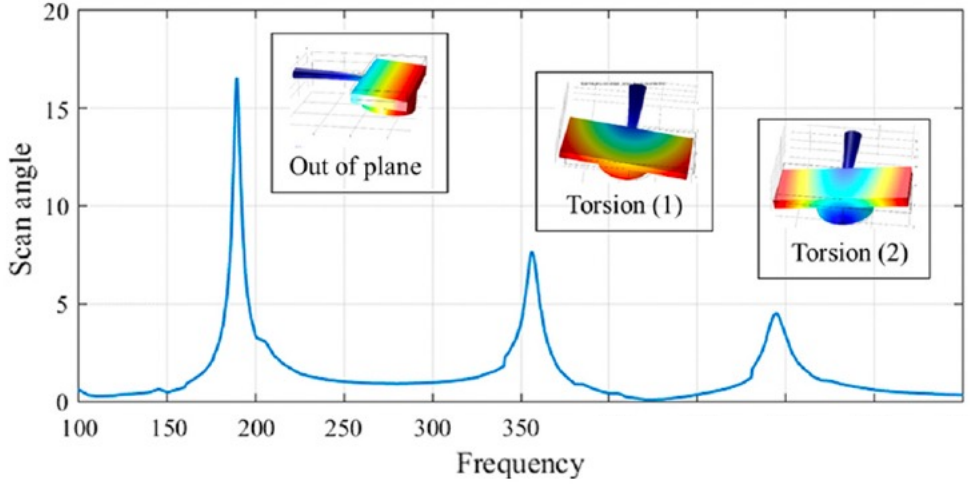


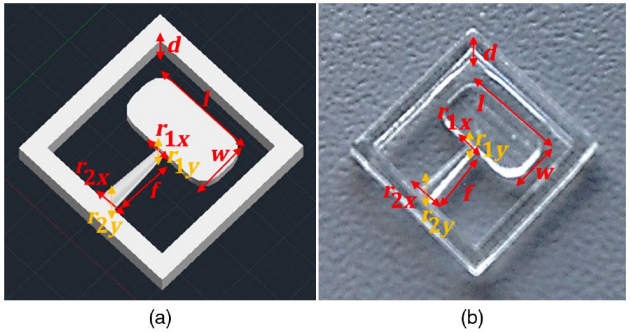


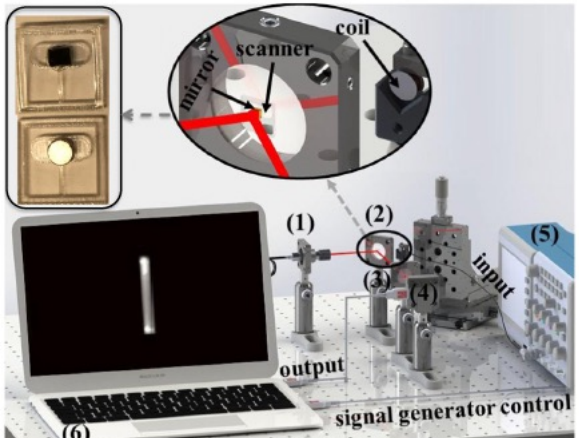
Subramanian et al, BOPEX, 2016
Zöğ et al, JMM, 2023

Part 2: Utilization of MATLAB

- *Data Acquisition and Automation*







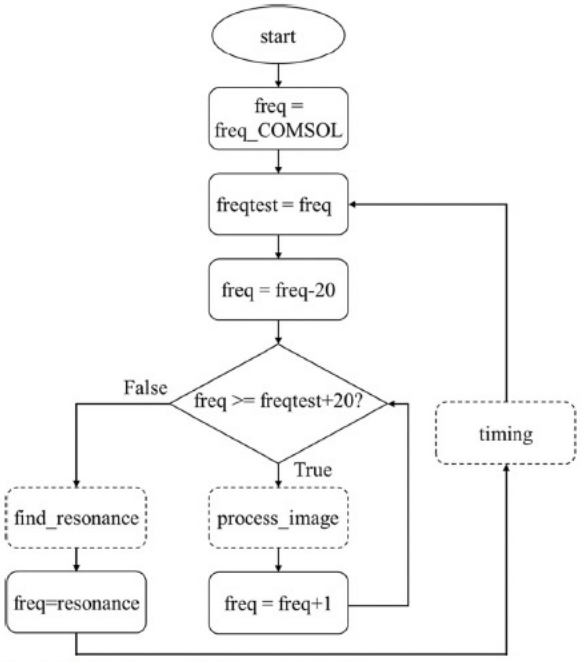
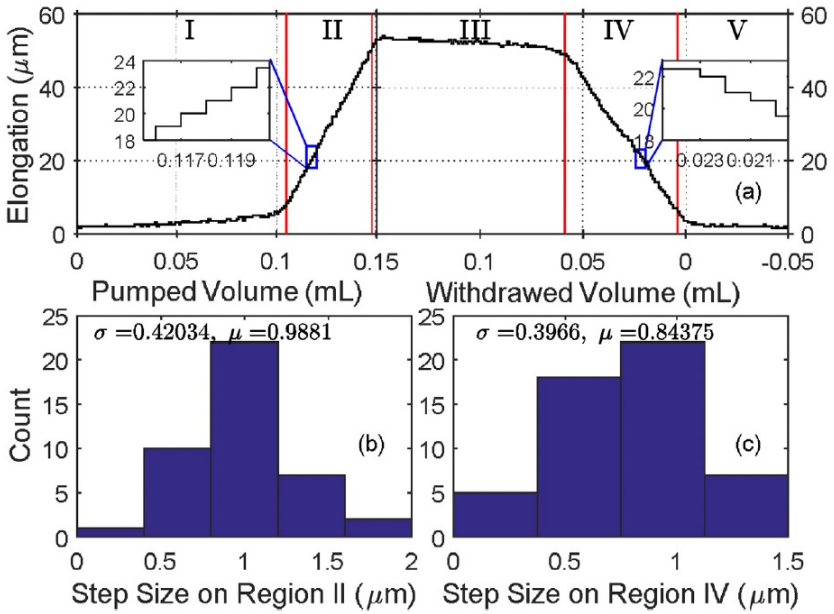


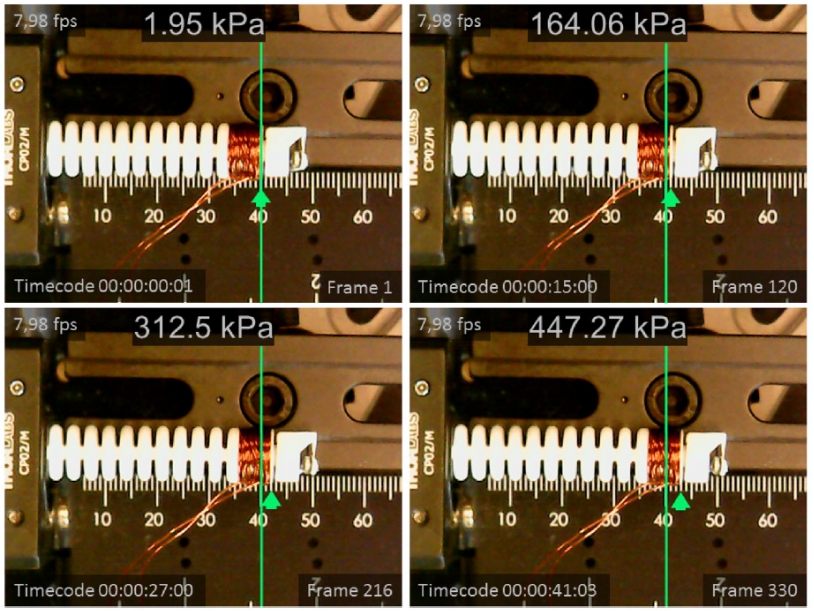
Fig. 4 Block diagram of the automation algorithm

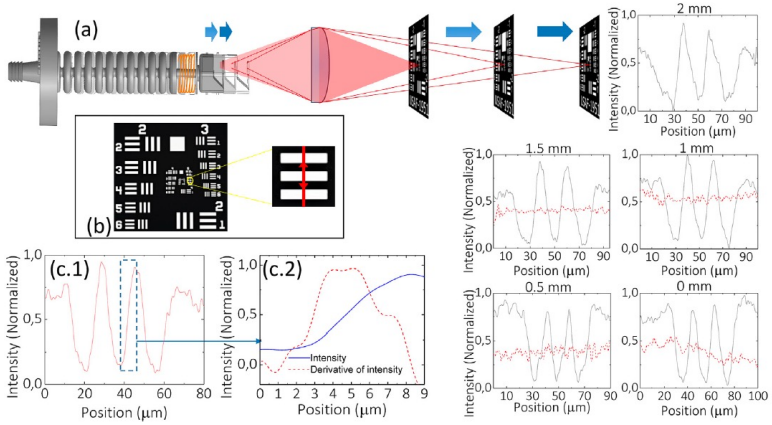
B. Gönültaş et al, JETTA, 2018
J. Savaş et al, Opt. Eng., 2018

Part 2: Utilization of MATLAB

- *Visualization of Actuation Capabilities*



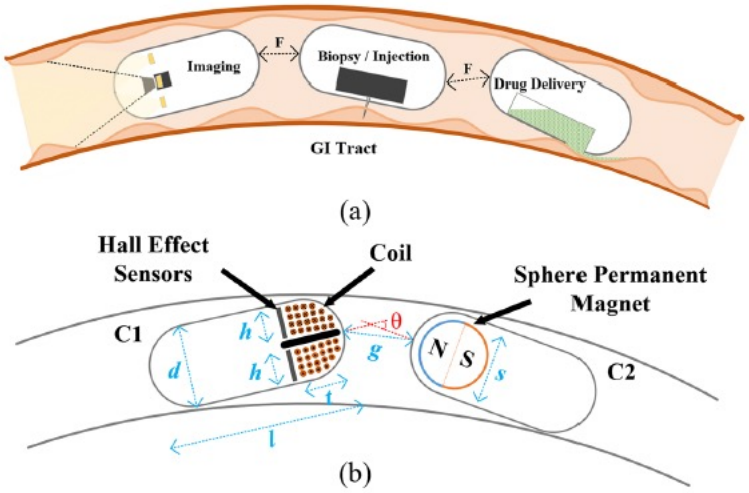


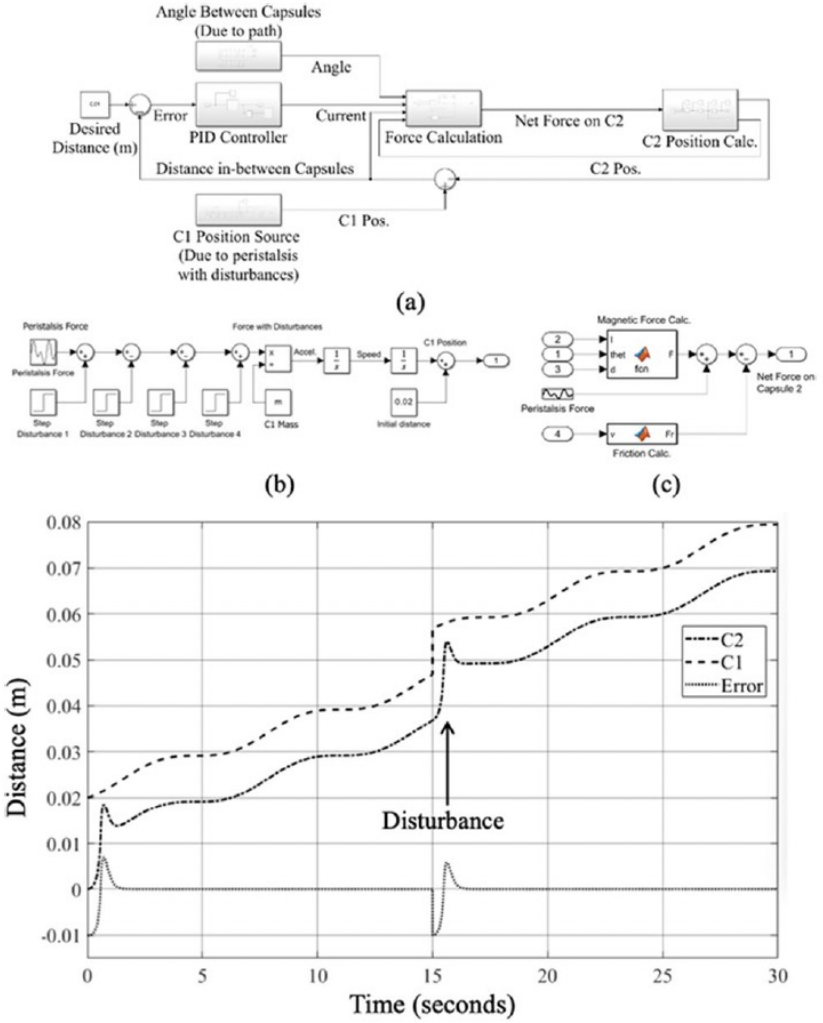


O. Gürcüoğlu et al, Sensors and Actuators, 2021

Part 2: Utilization of MATLAB

- *Simulink Modeling of Inter-Capsule Distance Control*





F. Peker, O. Ferhanoğlu, MBEC, 2023