

Research Trends on Biodegradable Polymers and Composites for Biomedical Actuators: Towards a Biodegradable Micropump

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Research Trends on Biodegradable Polymers and Composites for Biomedical Actuators: Towards a Biodegradable Micropump*

Elena Aprea, Feyza Pirim Aslan, Francesco Stallone, Leon Abelman, Lina Sarro, Clementine Boutry

Rotterdam, 23-26 September 2024



40th Anniversary
of the
IEEE International Conference
on Robotics & Automation
(ICRA@40)



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Micropumps have been introduced in literature in the late 1970s, and their design, actuation principle, and field of application have expanded ever since.

Possible Biomedical Applications:

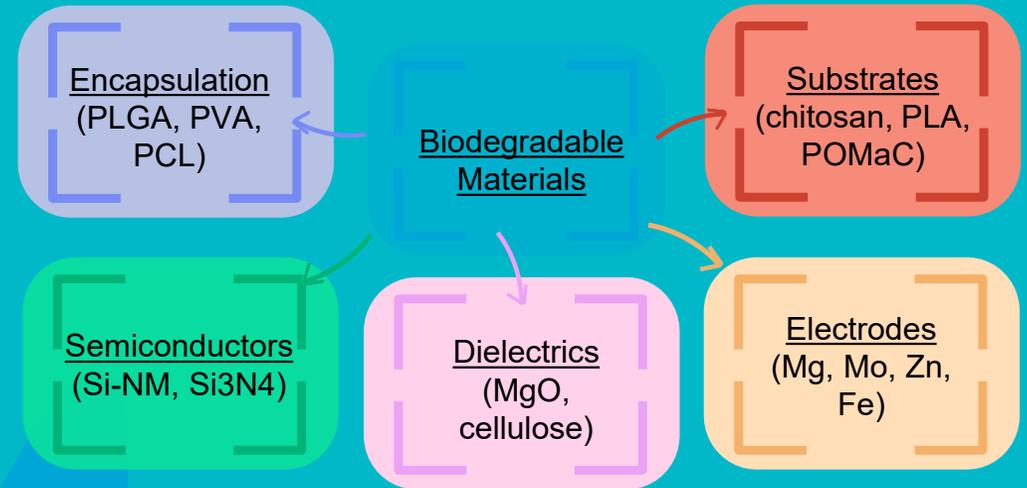
- Microfluidics
- Implants for drug delivery
- Soft miniaturized robots and actuators

Current Drawbacks:

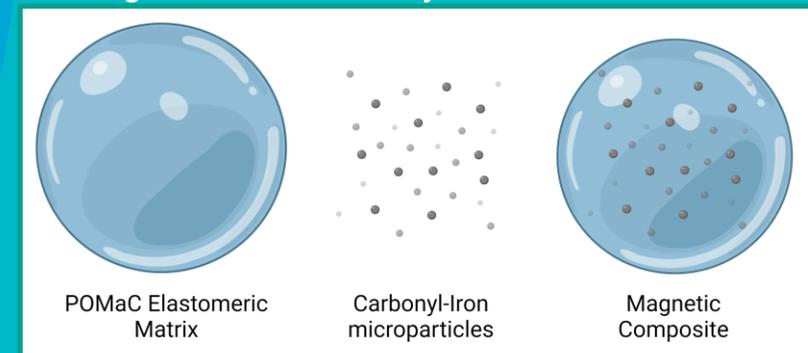
- Piezoelectric actuation (high voltage, bulky)
- Materials and biocompatibility

Goal:

Biodegradable polymer-based mechanical micropumps allow the development of biomedical actuators that do not require extraction surgery.

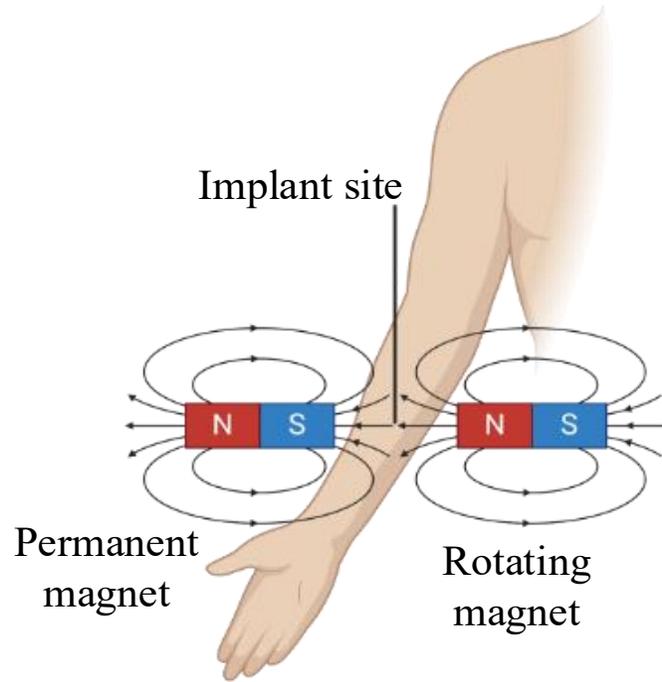


How to obtain a biodegradable and controllable material to generate remotely actuated devices?



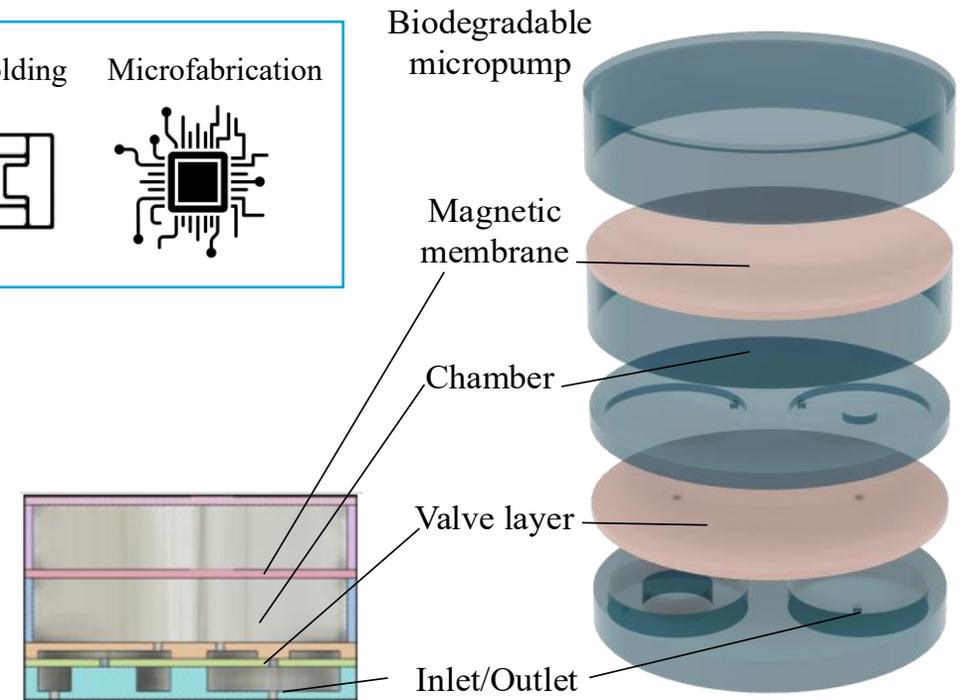
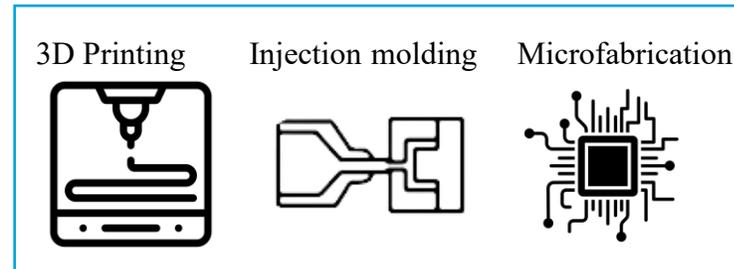
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Pure magnetism is explored as actuation mechanism using polymer magnetic composites.

Innovative fabrication techniques are employed to enable membrane actuation under magnetic fields



Thank you for your attention!

Elena Aprea

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