

Supplementary Materials

Microfluidic Applications of Artificial Cilia: Recent Progress, Demonstration, and Future Perspectives

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Table S1. Classifications of technologies and actuation/sensing mechanisms.

Fabrication methods	Actuation methods	Sensing mechanisms
Micro-molding fabrication techniques [1–8]	Optical actuation techniques [9,10]	Piezoresistive principle [11–21]
Photolithography fabrication techniques [22–24]	Electrostatic actuation techniques [25,26]	Magnetoresistive principle [22,27–31]
3D/4D/5D printing fabrication techniques [11,12,14,32,33]	pH actuation techniques [34–36]	Magnetoimpedance principle [37–39]
Facile bottom-up approaches [40,41]	Resonance actuation techniques [42]	Mechanocapacitive principle [43]
Roll-pulling approaches [44]	Pneumactical actuation techniques [45–47]	Triboelectric based [48]
Self-assembly fabrication techniques [49]	Electromagnetic actuation [8,50,51]	Electronic based [52]
Field-Effect Spinning approaches [53]	Permanent magnetic actuation [54]	
Dip-coating fabrication techniques [55]	Acoustic actuation techniques [56]	
	Electric stimulation actuation techniques [55,57]	
	Induced charge electro-osmosis using AC electric field techniques [58–61]	
	Thermal actuation techniques [62,63]	
	Actuation techniques for multi-responsive artificial cilia [64–66]	

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