Special Issue

Smart Microfluidic Technologies: Bridging Design, Discovery, and Deployment

Message from the Guest Editors

Lab-on-a-chip (LOC) technology, powered by microfluidics and nanotechnology, is revolutionizing biomedical research by enabling miniaturized, high-throughput, and cost-effective solutions. With the integration of advances in single-cell multi-omics, AI-driven analytics, and biofabrication, LOC systems are advancing precision medicine, from dynamic disease modeling to real-time diagnostics and accelerated therapeutic discovery. The scope of this Special Issue includes, but is not limited to, the following topics:

- **Next-generation platforms**: 3D bioprinted microfluidic devices, organoid-based systems, AI-optimized microfluidic chip designs, and on-chip bioreactors.
- **Functional expansion**: Single-cell metabolomics, precise control of microenvironmental factors, point-of-care testing (POCT) devices, and biosensors.
- **Towards clinical applications**: Advanced biosensors for liquid biopsy, scalable manufacturing methods, and strategies for regulatory compliance in LOC systems.

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Deadline for manuscript submissions

10 January 2026

Applied Sciences

an Open Access Journal by MDPI

Impact Factor 2.5
CiteScore 5.5

mdpi.com/si/238747

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Message from the Editor-in-Chief

As the world of science becomes ever more specialized, researchers may lose themselves in the deep forest of the ever increasing number of subfields being created. This open access journal Applied Sciences has been started to link these subfields, so researchers can cut through the forest and see the surrounding, or quite distant fields and subfields to help develop his/her own research even further with the aid of this multi-dimensional network.

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