Special Issue

Droplet Microfluidic-Based Systems: Fundamentals, Applications, and Future Directions

Message from the Guest Editors

Droplet microfluidics has emerged as a powerful platform for a wide range of biochemical and industrial applications. The small spatial scales and high surface-to-volume ratios inherent to droplet-based systems offer unique advantages, including precise control of reagent volumes, well-defined reaction conditions, rapid mixing, enhanced interfacial effects, and high-throughput capabilities. These systems can facilitate biochemical reactions that are challenging to achieve in bulk phases. Over the past two decades, droplet microfluidics-based systems have been extensively investigated and applied in fields such as high-throughput screening, 3D printing, and wearable electronics. As we enter the middle of the fourth decade in the history of microfluidics, new knowledge, concepts, and technologies continue to emerge. For example, the development of artificial intelligence is paving the way for more advanced and sensitive droplet microfluidics-based systems.

This Special Issue will highlight the latest fundamental studies and innovative applications in droplet microfluidics. We welcome submissions in the form of research papers, short communications, and review articles.

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Editor-in-Chief

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