



# Digital Microfluidic Biochips: Synthesis, Testing, and Reconfiguration Techniques

*Krishnendu Chakrabarty, Fei Su*

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**Digital Microfluidic Biochips** focuses on the automated design and production of microfluidic-based biochips for large-scale bioassays and safety-critical applications. Bridging areas of electronic design automation with microfluidic biochip research, the authors present a system-level design automation framework that addresses key issues in the design, analysis, and testing of digital microfluidic biochips.

The book describes a new generation of microfluidic biochips with more complex designs that offer dynamic reconfigurability, system scalability, system integration, and defect tolerance. Part I describes a unified design methodology that targets design optimization under resource constraints. Part II investigates cost-effective testing techniques for digital microfluidic biochips that include test resource optimization and fault detection while running normal bioassays. Part III focuses on different reconfiguration-based defect tolerance techniques designed to increase the yield and dependability of digital microfluidic biochips.

Expanding upon results from ongoing research on CAD for biochips at Duke University, this book presents new design methodologies that address some of the limitations in current full-custom design techniques.

**Digital Microfluidic Biochips** is an essential resource for achieving the integration of microfluidic components in the next generation of system-on-chip and system-in-package designs.

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