



From MEMS to Bio-MEMS and Bio-NEMS: Manufacturing Techniques and Applications (Fundamentals of Microfabrication and Nanotechnology)

Marc J. Madou

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From MEMS to Bio-MEMS and Bio-NEMS: Manufacturing Techniques and Applications details manufacturing techniques applicable to bionanotechnology. After reviewing MEMS techniques, materials, and modeling, the author covers nanofabrication, genetically engineered proteins, artificial cells, nanochemistry, and self-assembly. He also discusses scaling laws in MEMS and NEMS, actuators, fluidics, and power and brains in miniature devices. He concludes with coverage of various MEMS and NEMS applications. Fully illustrated in color, the text contains end-of-chapter problems, worked examples, extensive references for further reading, and an extensive glossary of terms.

Details the Nanotechnology, Biology, and Manufacturing Techniques Applicable to Bionanotechnology

Topics include:

- Nonlithography manufacturing techniques with lithography-based methods
- Nature as an engineering guide and contrasts top-down and bottom-up approaches
- Packaging, assembly, and self-assembly from ICs to DNA and biological cells
- Selected new MEMS and NEMS processes and materials, metrology techniques, and modeling
- Scaling laws, actuators, power generation, and the implementation of brains in miniaturized devices
- Different strategies for making micromachines smarter
- The transition out of the laboratory and into the marketplace

The third volume in **Fundamentals of Microfabrication and Nanotechnology, Third Edition, Three-Volume Set**, the book discusses top-down and bottom-up manufacturing methods and explains how to use nature as a guide. It provides a better understanding of how to match different manufacturing options with a given application that students can use to identify additional killer MEMS and NEMS applications.

Other volumes in the set include:

- **Solid-State Physics, Fluidics, and Analytical Techniques in Micro- and Nanotechnology**
- **Manufacturing Techniques for Microfabrication and Nanotechnology**

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