Biomechatronic Design in Biotechnology: A Methodology for Development of Biotechnological Products
Carl-Fredrik Mandenius, Mats Björkman

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DESCRIPTION

“… a must-read for all modern bio-scientists and engineers working in the field of biotechnology.” – Biotechnology Journal, 2012, 7

A cutting-edge guide on the fundamentals, theory, and applications of biomechatronic design principles

Biomechatronic Design in Biotechnology presents a complete methodology of biomechatronics, an emerging variant of the mechatronics field that marries biology, electronics, and mechanics to create products where biological and biochemical, technical, human, management-and-goal, and information systems are combined and integrated in order to solve a mission that fulfills a human need. A biomechatronic product includes a biological, mechanical, and electronic part.

Beginning with an overview of the fundamentals and theory behind biomechatronic technology, this book describes how general engineering design science theory can be applied when designing a technical system where biological species or components are integrated. Some research methods explored include schemes and matrices for analyzing the functionality of the designed products, ranking methods for screening and scoring the best design solutions, and structuring graphical tools for a thorough investigation of the subsystems and sub-functions of products.

This insightful guide also:

• Discusses tools for creating shorter development times, thereby reducing the need for prototype testing and verification
• Presents case study-like examples of the technology used such as a surface plasmon resonance sensor and a robotic cell culturing system for human embryonic stem cells

• Provides an interdisciplinary and unifying approach of the many fields of engineering and biotechnology used in biomechatronic design

By combining designs between traditional electronic and mechanical subsystems and biological systems, this book demonstrates how biotechnology and bioengineering design can utilize and benefit from commonly used design tools—and benefit humanity itself.

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**ABOUT THE AUTHOR**

**Professor Carl-Fredrik Mandenius** is head of the Division of Biotechnology at Linkoping University in Sweden. His main research interests include biochemical and bio-production engineering, bioprocess monitoring and control, stem cell technology, and biosensor technology. He was a director for process R&D at Pharmacia AB and has coordinated several EU networks on hESC-derived models for drug testing.

**Professor Mats Björkman** is head of the Division of Assembly Technology at Linkoping University in Sweden. His main research interests include design and operation of flexible manufacturing systems and equipment. He has also been involved in research that has developed from traditional mechanical industries to include areas such as electronic manufacturing and manufacturing of biotech equipment, as well as pharmaceutical products.

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