Materiomics

This complete, yet concise, guide introduces you to the rapidly developing field of high-throughput screening of biomaterials: materiomics. Bringing together the key concepts and methodologies used to determine biomaterial properties, it will allow you to understand the adaptation and application of materiomics in areas such as rapid prototyping, lithography and combinatorial chemistry. Each chapter is written by internationally renowned experts, and includes tutorial paragraphs on topics such as biomaterial-banking, imaging, assay development, translational aspects and informatics. Case studies of state-of-the-art experiments provide illustrative examples, while lists of key publications allow you to read up easily on the most relevant background material. Whether you are a professional scientist in industry, a student or a researcher, this book is not to be missed if you are interested in the latest developments in biomaterials research.

Jan de Boer is a Professor of Applied Cell Biology at the University of Twente, the Netherlands, at the MIRA Institute for Biomedical Technology and Technical Medicine, where his team performs innovative research on molecular and cellular engineering of bone tissue. He is chair of the Netherlands Society of Biomaterials and Tissue Engineering, and co-founder of the biotech company Materiomics B.V.

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High-Throughput Screening of Biomaterial Properties

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Preface

It's that sense of unease when you step out of the airport terminal building and onto the streets of Kathmandu. Or the moment when you open the door to your new office to see unfamiliar faces waiting for you. Step out of your comfort zone and discover how exciting, thrilling and liberating it can be: a new world is waiting for you. This book is about stepping out of the comfort zone of your own scientific discipline and about exposing yourself to something new. Embrace all the scientific disciplines that build modern-day biomaterials research, in the cultural hotpot of materiomics. Don't let the jargon and three-letter abbreviations of cell biology hold you back, nor the abracadabra of statistical models, nor the Latin terms for body parts and diseases. Learn a new language and a whole new culture is waiting for you.

The compilation of this book was initiated after an exciting conference termed 'High throughput screening of biomaterials: shaping a new research area', held beside the Amsterdam canals in April 2011. The meeting was attended by 50 selected scientists from all over the globe and across all the disciplines of biomaterials research, and the format of the conference took away that sense of unease. Chemists talked to clinicians, biologists listened to information scientists, engineers brainstormed with policy makers. We decided to bring this open and inviting atmosphere to the public through this book. Therefore, each chapter contains a tutorial on the topic for non-experts, gives an overview of the current status of that field and discusses how this technology will further shape the future of materiomics. The result of this exciting journey is presented here and was made possible only with the help of all the authors and those who contributed to the organization of the conference (Anouk Mentink), the editing of the book (Ruben Burer) or the chapters (Kristen Johnson). We hope that this book will be a scientific passport which lets you travel across the border of your discipline and helps you to learn to appreciate that of others. You won't be disappointed. Enjoy your journey!

Jan de Boer

'The adventurous spirit of this book, and indeed the field of materiomics, is excellently prefaced by Jan de Boer in this thorough compilation of concise chapters produced by an international cast of experts. It succeeds in its aim to be of use to both the student and the experienced practitioner in the multi-faceted emerging discipline of materiomics, containing both useful information and thought-provoking discussion and future perspectives. I would recommend it both to those interested in and to those already immersed in this rapidly evolving field.'

Morgan Alexander, The University of Nottingham

'By dissecting the contribution of various disciplines of diverse nature, ranging from chemistry to informatics or from advanced imaging to rapid prototyping, the book organically defines Materiomics as a field of its own. The reader is ultimately left with the awareness that the field of Materiomics will play a central role in future approaches to design complex material systems with predictable properties, for biomedical or industrial applications.'

Ivan Martin, University Hospital Basel