Molecular Communication

This comprehensive guide, by pioneers in the field, brings together, for the first time, everything a new researcher, graduate student or industry practitioner needs to get started in molecular communication. Written with accessibility in mind, it requires little background knowledge, and provides a detailed introduction to the relevant aspects of biology and information theory, as well as coverage of practical systems.

The authors start by describing biological nanomachines, the basics of biological molecular communication, and the microorganisms that use it. They then proceed to engineered molecular communication and the molecular communication paradigm, with mathematical models of different types of molecular communication, and a description of the information and communication theory of molecular communication. Finally, the practical aspects of designing molecular communication systems are presented, including a review of the key applications.

Ideal for engineers and biologists looking to get up to speed on the current practice in this growing field.

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CAMBRIDGE
UNIVERSITY PRESS

CAMBRIDGE
UNIVERSITY PRESS

University Printing House, Cambridge CB2 8BS, United Kingdom

Published in the United States of America by Cambridge University Press, New York

Cambridge University Press in part of the University of Cambridge.

It furthers the University's mission by disseminating knowledge in the pursuit of education, learning and research at the highest international levels of excellence.

www.cambridge.org
Information on this title: www.cambridge.org/9781107023086

First published 2013

Printing in the United Kingdom by TJ International Ltd. Padstow Cornwall

A catalogue record for this publication is available from the British Library

Library of Congress Cataloguing in Publication data
Nakano, Tadashi, 1912–
Molecular communication / Tadashi Nakano, Andrew W. Eckford.
pages cm
Includes bibliographical references and index.
ISBN 978-1-107-02308-6 (hardback)
1. Molecular communication (Telecommunication) 2. Molecules.
3. Nanotechnology. I. Title.
TK5013.57.N35 2013
620′.5–dc23 2013009571

ISBN 978-1-107-02308-6 Hardback

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Preface

As early researchers in molecular communication, we have been amazed by the rapid expansion of the field. A decade ago, virtually nobody worked in this area; today, dozens of researchers form a multi-national research community, and over a hundred papers have been published. At the frontiers of the field, there are fundamental questions to be answered such as the relationship between information theory and biology; and disruptive innovations to be developed, such as direct manipulation of structures in the human body at a microscopic level.

Given the advances over the past few years, we believe the time is right to take stock of the field and publish a complete overview of the state of the art. In an interdisciplinary field such as this one, we hope this book can provide a needed common point of reference. Moreover, in an evolving field such as this one, we recognize that our book should not be considered the final word on the field. Indeed, in writing it we have become fully aware of the many important open problems and research questions that need to be addressed for this field to reach its potential, and we hope our book is viewed as an invitation to further research, to expand upon this exciting new discipline.

Finally, we would like to thank the many people whose work, discussions, and encouragement over the years have made this book possible: in no particular order, Akihiro Enomoto (Qualcomm), Ryota Egashira (Yahoo! Inc.), Yasushi Hiraoka (Osaka University/National Institute of Information and Communications Technology), Satoshi Hiyama (NTT DoCoMo), Takako Koujin (National Institute of Information and Communications Technology), Shouhei Kobayashi (National Institute of Information and Communications Technology), Jian-Qin Liu (National Institute of Information and Communications Technology), Michael Moore (Pennsylvania State University), Yuki Moritani (NTT DoCoMo), Kazuo Oiwa (National Institute of Information and Communications Technology), Yutaka Okaie (Osaka University), Jianwei Shuai (Xiamen University), Tatsuya Suda (Netgroup Inc.), Nariman Farsad (York University), Lu Cui (York University), Peter Thomas (Case Western Reserve University), Raviraj S. Adve (University of Toronto), K. V. Srinivas (Samsung), Sachin Kadloor (University of Illinois at Urbana-Champaign), Chris Rose (Rutgers), and Chan-Byoung Chae (Yonsei University).