

"The time is right to bring new approaches to the analysis of biological data. Topological data analysis reveals the structure of data. This book shows how algebraic topology opens new doors, presenting ideas and directions that make testable predictions and explore life processes."

Professor Arnold J. Levine, Simons Center for Systems Biology, Institute for Advanced Study

"This fascinating book describes how advances in mathematics, especially in fields such as topology, are transforming our understanding of biology. Rabadán, one of the founders of the field, shows us how the evolution of cancer, and of viruses and bacteria, can be deeply understood through these novel mathematical techniques. Rabadán's capacity to create a synthesis of many threads, and lay out future challenges, makes this an intriguing and compelling read."

Professor Siddhartha Mukherjee, Columbia University Medical Center, New York; Author of *The Gene: An Intimate History* and *The Emperor of All Maladies: A Biography of Cancer* (Pulitzer Prize, 2011)

"This is a very important work that shows the way to applications of topological data analysis in genomics. It should be studied carefully by anyone working on the biomedical applications of topological data analysis."

Professor Gunnar Carlsson, Stanford University

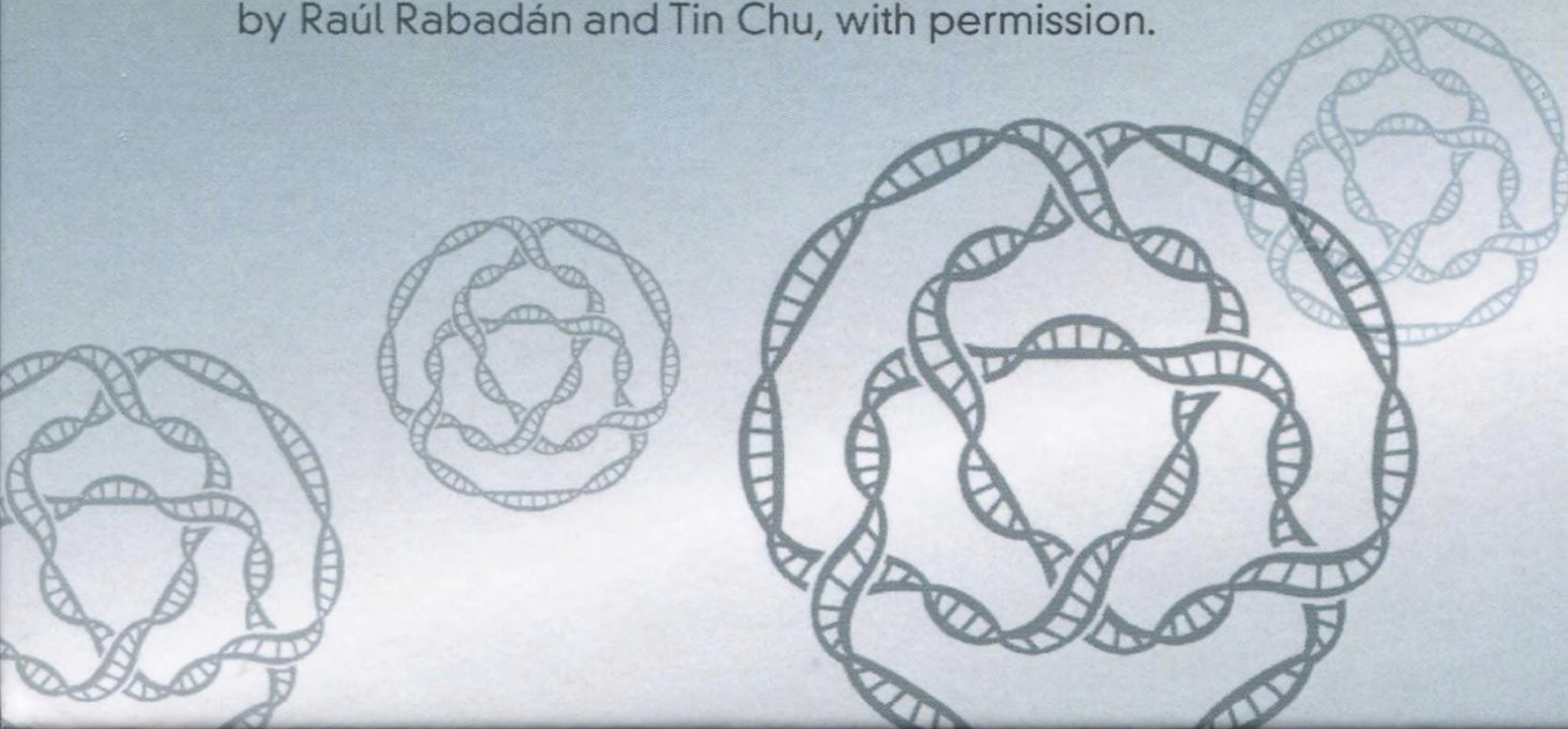
"This is an important book. Modern experimental biology produces large amounts of data and of many disparate types, requiring new methods of analysis. In explaining biology to mathematicians and data scientists, and subtle new statistical analyses based on the flexible form of geometry called topology to biologists, carefully and clearly, without sacrificing accuracy, the authors have written a unique book that is cutting edge, truly interdisciplinary, and a resource for both communities. I found it fascinating, and will insist that my students read it."

Shmuel Weinberger, Andrew MacLeish Distinguished Service Professor of Mathematics, University of Chicago

RAÚL RABADÁN is a Professor and Director of the Program for Mathematical Genomics at Columbia University, New York.

ANDREW J. BLUMBERG is a Professor in the Department of Mathematics at the University of Texas, Austin.

Cover illustration: Borromean knots with DNA, by Raúl Rabadán and Tin Chu, with permission.



Cover design: Andrew Ward

CAMBRIDGE
UNIVERSITY PRESS
www.cambridge.org

ISBN 978-1-107-15954-9



9 781107 159549 >