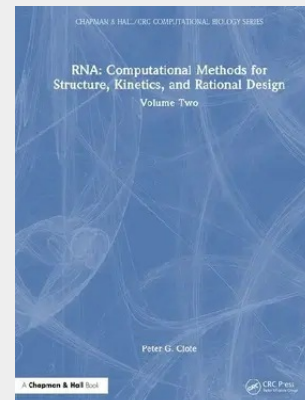


RNA: Computational Methods for Structure, Kinetics, and Rational Design

Volume Two

Comprising two volumes, RNA: Computational Methods for Structure, Kinetics, and Rational Design is a comprehensive treatment of computational methods concerning the secondary structure, folding kinetics and rational design of RNA. Volume 2 covers secondary structure folding kinetics, starting with an inquiry into whether the ensemble of RNA structures is small-world or scale-free, then proceeding to the identification of local energy minima that create a basin of attraction, leading to a coarse-grained kinetics model. The book describes Markov state models created from secondary structure folding trajectories generated by the kinetic Monte Carlo (Gillespie) algorithm, the first such application. Python code is available at the book's website, allowing research teams to use the code and extend the approach. Current RNA research concerns the rational design of functional RNA molecules, which The book provides an overview and comparison of various inverse folding algorithms, combinatorial optimization, and the question of whether inverse folding is computationally hard (NP-complete). Another chapter focuses on various types of designed RNA including ribozymes, RNA thermometers, bistable switches, toehold switches, mRNA vaccines, and paper-based COVID-19 tests. The final chapter is a math appendix for the linear algebra and Markov chain results that are essential to folding kinetics. This book provides the nuts, bolts and tools for the next generation of computational work on RNA, especially for the rational design of functional molecules – a topic that not so long ago seemed more like science fiction. Exercises at the end of each chapter introduce new material or related concepts, and solutions are available at the book's website. It is perfect for advanced undergraduate, graduate and post-graduate readers having analytical interests and skills from areas such as physical chemistry, physics, mathematics, computer science, and statistics. Instructor slides, computer programs and solutions to all exercises from Volumes 1 and 2 can be found at the following website: <https://github.com/pgclote/RNA-Computational-methods-for-structure-kinetics-and-rational-design-Solutions-slides-etc.->



190,50 €

190,50 € (zzgl. MwSt.)

vorbestellbar, Erscheinungstermin ca. April 2026

Artikelnummer: 9781032496672

Medium: Buch

ISBN: 978-1-032-49667-2

Verlag: Taylor & Francis Ltd

Erscheinungstermin: 14.04.2026

Sprache(n): Englisch

Auflage: 1. Auflage 2026

Serie: Chapman & Hall/CRC

Computational Biology Series

Produktform: Gebunden

Gewicht: 930 g

Seiten: 418

Format (B x H): 210 x 280 mm

