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Ernesto Picardi *Editor*

RNA Bioinformatics

Second Edition

 Humana Press

Rna Bioinformatics Methods In Molecular Biology

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Rna Bioinformatics Methods In Molecular Biology:

RNA Bioinformatics Ernesto Picardi, 2021-05-22 This detailed book aims to provide an overview of novel bioinformatics resources for exploring diverse aspects of RNA biology This edition focuses on methods dealing with non coding RNA miRNAs circRNAs or lncRNAs RNA modifications m6A or RNA editing single cell RNA seq and statistical models to handle count data from RNA seq experiments The book also includes chapters based on the classical RNA bioinformatics methods such as those for deciphering secondary and tertiary RNA structures however they are revised to take into account deep sequencing data Finally chapters describing methods to analyze RNA sequencing data from emerging third generation sequencing technologies that could provide interesting insights into the transcriptional process and its regulation are also included Written for the highly successful Methods in Molecular Biology series chapters include the kind of expert implementation advice that encourages quality results Comprehensive and up to date RNA Bioinformatics Second Edition serves as an ideal guide for researchers digging ever deeper into the depths of the study of RNAs The chapter RNA Seq Data Analysis in Galaxy is open access under a CC BY 4 0 license

RNA Sequence, Structure, and Function Jan Gorodkin, Walter L. Ruzzo, 2014 The existence of genes for RNA molecules not coding for proteins ncRNAs has been recognized since the 1950 s but until recently aside from the critically important ribosomal and transfer RNA genes most focus has been on protein coding genes However a long series of striking discoveries from RNA s ability to carry out catalytic function to discovery of riboswitches microRNAs and other ribo regulators performing critical tasks in essentially all living organisms has created a burgeoning interest in this primordial component of the biosphere However the structural characteristics and evolutionary constraints on RNA molecules are very different from those of proteins necessitating development of a completely new suite of informatic tools to address these challenges In RNA Sequence Structure Function Computational and Bioinformatic Methods expert researchers in the field describe a substantial and relevant fraction of these methodologies from both practical and computational algorithmic perspectives Focusing on both of these directions addresses both the biologist interested in knowing more about RNA bioinformatics as well as the bioinformaticist interested in more detailed aspects of the algorithms Written in the highly successful Methods in Molecular Biology series format the chapters include the kind of detailed description and implementation advice that is crucial for getting optimal results Thorough and intuitive RNA Sequence Structure Function Computational and Bioinformatic Methods aids scientists in continuing to study key methods and principles of RNA bioinformatics

Computational Biology of Non-Coding RNA Xin Lai, Shailendra Gupta, Julio Vera Gonzalez, 2024-12-19 This second edition details a collection of state of art methods including identification of novel ncRNAs and their targets functional annotation and disease association in different biological contexts Chapters guide readers through an overview of disease specific ncRNAs computational methods and workflows for ncRNA discovery annotation based on high throughput sequencing data bioinformatics tools and databases for ncRNA analyses

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Computational Methods for Understanding

Riboswitches, 2015-02-24 This new volume of Methods in Enzymology continues the legacy of this premier serial with quality chapters authored by leaders in the field This volume covers computational prediction RNA structure and dynamics including such topics as computational modeling of RNA secondary and tertiary structures riboswitch dynamics and ion RNA ligand RNA and DNA RNA interactions Continues the legacy of this premier serial with quality chapters authored by leaders in the field Covers computational methods and applications in RNA structure and dynamics Contains chapters with emerging topics such as RNA structure prediction riboswitch dynamics and thermodynamics and effects of ions and ligands

RNA Structure Prediction Risa Karakida Kawaguchi, Junichi Iwakiri, 2023-01-27 This book explores recent progress in RNA secondary tertiary structure prediction and its application from an expansive point of view Because of advancements in experimental protocols and devices the integration of new types of data as well as new analysis techniques is necessary and this volume discusses additional topics that are closely related to RNA structure prediction such as the detection of structure disrupting mutations high throughput structure analysis and 3D structure design Written for the highly successful Methods in Molecular Biology series chapters feature the kind of detailed implementation advice that leads to quality research results Authoritative and practical RNA Structure Prediction serves as a valuable guide for both experimental and computational RNA researchers

RNA: Computational Methods for Structure, Kinetics, and Rational Design: Volume One Peter G. Clote, 2025-03-20 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 One concerns energy and structure and is divided into five chapters Chapter 1 describes the molecular structure of ribonucleotides basic classes of RNA and databases of RNA sequences and structure Chapter 2 presents the basic concepts of thermodynamics since thermodynamics based algorithms constitute an essential tool in rational design of functional RNA molecules Chapter 3 describes how empirical secondary structure energy parameters are obtained from ultraviolet absorbance experiments via Van t Hoff plots and least squares data fitting Chapter 4 describes methods from combinatorics automata and formal language theory and complex analysis Chapter 5 provides an overview of some of the most important thermodynamics based algorithms related to secondary structure Exercises and solutions are provided at the end of every chapter and source code is available at the book s website sometimes including computer programs using Python and extensions Numpy and Scipy This book provides the nuts bolts and tools to take the next steps in computational

RNA synthetic biology 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

Laboratory Methods in Enzymology: RNA Jon Lorsch, 2013-09-11 Methods in Enzymology volumes provide an indispensable tool for the researcher Each volume is carefully written and edited by experts to contain state of the art reviews and step by step protocols In this volume we have brought together a number of core protocols concentrating on RNA complementing the traditional content that is found in past present and future Methods in Enzymology volumes Indispensable tool for the researcher Carefully written and edited by experts to contain step by step protocols In this volume we have brought together a number of core protocols concentrating on RNA RNA Structure and Function Jan Barciszewski, 2023-11-03 This book focuses on the current status of our understanding of RNA a key biological molecule The various RNAs covered are messenger RNA ribosomal RNA transfer RNA noncoding RNAs modified nucleosides and RNA enzymes The different chapters detail methods to investigate RNA structure and function the chemistry of modified RNAs and the latest advances in our understanding of the vast array of biological processes in which RNA is involved RNA in one form or another touches almost everything in a cell RNA has both structural and catalytic properties RNA fulfills a broad range of functions These molecules are no longer seen as passive elements transferring the genetic information from DNA into proteins but regulate the activity of genes during development cellular differentiation and changing environments RNAs are involved in various aspects of cell physiology and disease development Discoveries of RNA with unexpected diverse functions in healthy and diseased cells such as the role of RNA as both the source and countermeasure to cancer or severe viral infection stimulate new trends passion and solutions for molecular medicine In this book fundamental questions about the biochemical and genetic importance of RNA how mRNAs are generated and used to produce proteins how noncoding and catalytic RNAs mediate key cellular processes how to determine RNA structure and how to apply RNA in treatment of diseases This book is an essential resource for researches in academia and industry contributing to the development of new RNA therapeutics The book is geared toward scientists from the graduate level on up and particularly appeals to active investigators in RNA biology molecular biology and biochemistry **RNA Therapeutics in Human Diseases** Phei Er Saw, Erwei Song, 2025-06-09 RNA Therapeutics in Human Diseases is a comprehensive guide to the rapidly evolving field of RNA based therapies Divided into three parts the book covers RNA biology technical advancements in RNA therapeutics and their clinical applications It explores the roles of various RNAs including mRNA miRNA lncRNA and circRNA in disease mechanisms and therapeutic strategies as well as cutting edge techniques like RNA sequencing RNA nanotechnology and AI driven drug design Readers will gain in depth insights into the latest RNA research and its potential to transform genetic medicine providing both foundational knowledge and practical perspectives for researchers clinicians and policymakers

FUNDAMENTALS OF BIOANALYTICAL TECHNIQUES AND INSTRUMENTATION, SECOND EDITION GHOSAL,

SABARI,AVASTHI, ANUPAMA SHARMA,2018-09-01 This thoroughly revised edition of the book demonstrates principle and instrumentation of each technique routinely used in biotechnology Like the previous edition the second edition also follows non mathematical approach Three aspects of each technique including principle methodology with knowledge of different parts of an instrument and applications have now been discussed in the text For the beginners the book will help in building a strong foundation starting from the preparation of solutions extraction separation and analysis of biomolecules to the characterisation by spectroscopic methods the full gamut of biological analysis NEW TO THE SECOND EDITION Incorporates two new chapters on Radioisotope Tracer Techniques and Basic Molecular Biology Techniques and Bioinformatics Comprises a full chapter on Fermentation and Bioreactors Design and Instrumentation the revised and updated version of Miscellaneous Methods of the previous edition Contains a number of pictorial illustrations tables and worked out examples to enhance students understanding of the topics Includes chapter end review questions TARGET AUDIENCE B Sc B Tech Biotechnology M Sc M Tech Biotechnology

Unveiling the Power of Verbal Artistry: An Psychological Sojourn through **Rna Bioinformatics Methods In Molecular Biology**

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