



Advanced Mechanical Models of DNA Elasticity

By Yakov M Tseytlin

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Advanced Mechanical Models of DNA Elasticity includes coverage on 17 different DNA models and the role of elasticity in biological functions with extensive references. The novel advanced helicoidal model described reflects the direct connection between the molecule helix structure and its specific properties, including nonlinear features and transitions. It provides an introduction to the state of the field of DNA mechanics, known and widely used models with their short analysis, as well as coverage on experimental methods and data, the influence of electrical, magnetic, ionic conditions on the persistence length, and dynamics with viscosity influence. It then addresses the need to understand the nature of the non-linear overstretching transition of DNA under force and why DNA has a negative twist-stretch coupling.

- Includes coverage of 17 contemporary models of DNA mechanics with analysis
- Provides comparison of DNA and RNA mechanical features
- Covers advances in experimental techniques including AFM, X-ray, and optical tweezers
- Contains extensive references for further reading

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Editorial Review

Review

"...an extremely useful book that describes the important concepts of advanced mechanical models of DNA elasticity and discusses extensive technical details, providing an effective way to get a better understanding of DNA mechanical features and functions. Score: 91 - 4 Stars" --**Doody's, *Advanced Mechanical Models of DNA Elasticity***

About the Author

YAKOV M. TSEYTLIN is a mechanical engineer, educator, and research scientist. Born in Leningrad, Russia; he arrived in the USA in 1992, becoming naturalized in 1997. His qualifications and professional positions include: MS in Mechanical Engineering, Leningrad Polytechnic Institute, PhD, 1965; Doctor of Technical Sciences, All-Russian Research Institute of Metrology, Russia, 1991; Chief of research laboratory, senior designer, senior and lead researcher, Leningrad Instrumental Plant, All-Russian Research Institute of Metrology, Russia; senior designer, senior researcher Federal Products Co. USA, 1992; project engineer in Automatic Machinery Co. US, 1999; assistant to associate professor in Leningrad Polytechnic Institute; visiting professor in Leningrad Institute of Precise Mechanics and Optics; Manager and Engineer, All-Russian Institute of Advanced Education in Standardization and Metrology;

Adviser and Opponent of Graduate Dissertations in Central Research Institute for Fuel Apparatus, All-Russian Research Institute of Metrology, Leningrad Polytechnic Institute. He has contributed numerous articles to professional journals, and authored 4 monographs. He is also a member of International Society of Automation (recognition awards 1998-2012, ISA). His achievements include development of methods and concepts in micro elasticity, DNA elasticity modeling, atomic force microscopy, and information criterion of measurement uncertainty negligibility.

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