List of Contributors

Nomenclature

- Introduction and Overview
- The Biological Importance of DNA
- The Origins of Nucleic Acids Research
- Early Structural Studies on Nucleic Acids
- The Discovery of the Structure of DNA
- The Advent of Molecular Biology
- The Partnership of Chemistry and Biology
- Frontiers in Nucleic Acids Research
- DNA and RNA Structure
- Structures of Components
- Standard DNA Structures
- **Real DNA Structures**
- Structures of RNA Species
- Dynamics of Nucleic Acid Structures
- Higher-order DNA Structures
- Nucleosides and Nucleotides
- Chemical Synthesis of Nucleosides
- Chemistry of Esters and Anhydrides of Phosphorus Oxyacids
- Nucleoside Esters of Polyphosphates
- **Biosynthesis of Nucleotides**
- Catabolism of Nucleotides
- Polymerisation of Nucleotides
- Therapeutic Applications of Nucleoside Analogues
- Synthesis of Oligonucleotides
- Synthesis of Oligodeoxyribonucleotides
- Synthesis of Oligoribonucleotides
- Enzymatic Synthesis of Oligonucleotides
- Synthesis of Modified Oligonucleotides
- Nucleic Acids in Biotechnology
- **DNA Sequence Determination**
- Gene Cloning
- Enzymes Useful in Gene Manipulation
- Gene Synthesis
- The Detection of Nucleic Acids Sequences by Hybridization
- Gene Mutagenesis
- Oligonucleotides as Reagents and Therapeutics
- Footprinting
- Genes and Genomes
- Gene Structure

Gene Families Intergenic DNA Chromosomes **DNA Sequence and Bioinformatics** Copying DNA DNA Mutation and Genome Repair **DNA Recombination RNA Structure and Function Overview of RNA Structural Motifs RNA** Processing and Modification RNAs in the Protein Factory: Translation RNAs Involved in Export and Transport **RNAs and Epigenetic Phenomena RNA Structure and Function in Viral Systems** Covalent Interactions of Nucleic Acids ith Small Molecules and Their Repair Hydrolysis of Nucleosides, Nucleotides, and Nucleic Acids **Reduction of Nucleosides** Oxidation of Nucleosides, Nucleotides, and Nucleic Acids **Reactions with Nucleophiles Reactions with Electrophiles** Reactions with Metabolically Activated Carcinogens **Reactions with Anti-cancer Drugs** Photochemical Modification of Nucleic Acids Effects of Ionising Radiation on Nucleic Acids **Biological Consequences of DNA Alkylation DNA Repair Reversible Small Molecule-Nucleic Acid Interactions** Introduction Binding Modes and Sites of Interaction Counter-ion Condensation and Polyelectrolyte Theory Non-specific Outside-edge Interactions Hydration Effects and Water-DNA Interactions **DNA Intercalation** Interactions in the Minor Groove Intercalation versus Minor Groove Binding Co-operativity in Ligand-DNA Interactions Small Molecule Interactions with Higher-order DNA **Protein-Nucleic Acid Interactions** Structural Features of DNA Important in Protein Recognition The Physical Chemistry of Protein-Nucleic Acid Interactions **Representative DNA Recognition Motifs**

Kinetic and Thermodynamic Aspects of Protein-Nucleic Acid Interactions The Specificity of DNA Enzymes DNA Packaging Polymerases Machines that Manipulate Duplex DNA RNA-Protein Interactions and RNA-mediated Assemblies Physical and Structural Techniques Applied to Nucleic Acids Spectroscopic Techniques Nuclear Magnetic Resonance X-ray Crystallography Hydrodynamic and Separation Methods Microscopy Mass Spectrometry Molecular Modelling and Dynamics Table of Contents provided by Blackwell's Book Services and R.R. Bowker. Used with permission.