

## **Genomics**

1. Comparative Genomics of Bacterial Species
2. Genome Annotation and Visualization Tools
3. Identification of Genetic Variants in Human Populations
4. Analysis of Mitochondrial Genomes
5. Evolutionary Genomics of Pathogens
6. Detection of Copy Number Variants in Cancer Genomes
7. Study of Gene Duplication Events in Plants
8. Functional Annotation of Non-Coding RNAs
9. Phylogenetic Analysis of Viral Genomes
10. Detection of Horizontal Gene Transfer Events
11. Analysis of Genetic Diversity in Crop Species
12. Metagenomics Analysis of Environmental Samples
13. Transcriptome Assembly and Annotation
14. Comparative Analysis of Metazoan Genomes
15. Identification of Disease-Associated Mutations
16. Study of Ancient DNA from Archaeological Samples
17. Analysis of Epigenomic Data
18. Genome-Wide Association Studies (GWAS)
19. Study of Gene Expression in Response to Stress
20. Analysis of RNA Editing Events

## **Proteomics**

21. Protein-Protein Interaction Networks
22. Analysis of Post-Translational Modifications
23. Comparative Proteomics of Different Tissues
24. Protein Structure Prediction
25. Analysis of Protein Folding Pathways
26. Functional Annotation of Hypothetical Proteins
27. Study of Proteins Involved in Cell Signaling
28. Quantitative Proteomics Using Mass Spectrometry
29. Protein-DNA Interaction Analysis
30. Identification of Protein Complexes
31. Analysis of Proteome Changes in Disease States
32. Study of Proteins in Cell Membranes

33. Enzyme Kinetics and Mechanisms
34. Analysis of Protein Domains and Motifs
35. Functional Analysis of Protein Isoforms
36. Structural Modeling of Protein-Protein Interactions
37. Identification of Protein Biomarkers
38. Comparative Analysis of Protein Families
39. Study of Protein Aggregation in Neurodegenerative Diseases
40. Analysis of Proteins in Metabolic Pathways

## **Transcriptomics**

41. Differential Gene Expression Analysis
42. RNA-Seq Data Analysis
43. Study of Alternative Splicing Events
44. Long Non-Coding RNA Characterization
45. MicroRNA Target Prediction
46. Single-Cell RNA-Seq Analysis
47. Transcriptome Analysis of Developmental Stages
48. Gene Co-Expression Network Analysis
49. Study of Gene Expression in Cancer
50. Analysis of RNA Stability and Degradation
51. Functional Annotation of Transcript Isoforms
52. Study of Circular RNAs
53. Analysis of Transcriptome Data from Model Organisms
54. Study of Stress-Responsive Genes
55. Comparative Transcriptomics of Different Species
56. Study of RNA-Binding Proteins
57. Analysis of Transcription Factor Binding Sites
58. Study of Transcriptomic Changes During Infection
59. Analysis of RNA Methylation Patterns
60. Transcriptome Analysis of Environmental Stress Responses

## **Structural Bioinformatics**

61. Protein Structure Alignment and Comparison
62. Homology Modeling of Protein Structures
63. Analysis of Protein-Ligand Interactions
64. Structural Analysis of Membrane Proteins

65. Molecular Dynamics Simulations
66. Study of Protein-Nucleic Acid Complexes
67. Structural Analysis of Viral Proteins
68. Study of Protein Folding Mechanisms
69. Analysis of Protein-Protein Interface
70. Comparative Analysis of Protein Superfamilies
71. Structural Basis of Enzyme Catalysis
72. Study of Protein Conformational Changes
73. Analysis of Protein Structure-Function Relationships
74. Docking Studies of Drug-Protein Interactions
75. Structural Analysis of Antibody-Antigen Interactions
76. Study of Protein Stability and Mutations
77. Analysis of Protein Structural Motifs
78. Structural Analysis of Transport Proteins
79. Study of Protein Engineering and Design
80. Structural Analysis of Protein Complexes

## **Systems Biology**

81. Construction of Metabolic Pathways
82. Analysis of Gene Regulatory Networks
83. Study of Cellular Signaling Pathways
84. Modeling of Biological Systems
85. Study of Metabolic Flux Analysis
86. Analysis of Cell Cycle Regulation
87. Study of Systems Pharmacology
88. Computational Modeling of Tissue Development
89. Analysis of Immune System Networks
90. Study of Synthetic Biology Circuits
91. Modeling of Gene Expression Noise
92. Study of Multiscale Biological Systems
93. Analysis of Network Motifs in Biological Systems
94. Study of Epigenetic Regulation Networks
95. Analysis of Cellular Differentiation Pathways
96. Study of Host-Pathogen Interaction Networks
97. Analysis of Circadian Rhythms
98. Modeling of Tumor Growth and Metastasis
99. Study of Aging and Longevity Networks

100. Analysis of Systems Toxicology

## **Bioinformatics Tools and Databases**

101. Development of Sequence Alignment Tools
102. Construction of Biological Databases
103. Development of Visualization Tools for Omics Data
104. Analysis of High-Throughput Sequencing Data
105. Development of Tools for Protein Structure Prediction
106. Construction of Metabolic Network Databases
107. Development of Tools for Genome Annotation
108. Analysis of Mass Spectrometry Data
109. Development of Pathway Analysis Tools
110. Construction of MicroRNA Databases
111. Development of Tools for Phylogenetic Analysis
112. Construction of Epigenomic Databases
113. Development of Single-Cell Analysis Tools
114. Analysis of ChIP-Seq Data
115. Development of Tools for Gene Expression Analysis
116. Construction of Protein-Protein Interaction Databases
117. Development of Metagenomics Analysis Tools
118. Analysis of Proteomics Data
119. Development of Tools for RNA-Seq Analysis
120. Construction of Functional Genomics Databases

## **Data Integration and Analysis**

121. Integration of Multi-Omics Data
122. Analysis of Clinical Genomics Data
123. Study of Genetic and Environmental Interactions
124. Analysis of Large-Scale Genomic Data
125. Integration of Transcriptomics and Proteomics Data
126. Study of Epigenomics and Transcriptomics Integration
127. Analysis of Personalized Medicine Data
128. Integration of Metabolomics and Proteomics Data
129. Study of Single-Cell Multi-Omics Data
130. Analysis of Cancer Genomics Data
131. Integration of Genomics and Environmental Data

132. Study of Host-Microbiome Interactions
133. Analysis of Longitudinal Omics Data
134. Integration of Genomics and Phenotypic Data
135. Study of Multi-Omics Data in Disease Research
136. Analysis of Integrative Genomics Data
137. Integration of Genomics and Transcriptomics Data
138. Study of Genetic and Epigenetic Interactions
139. Analysis of Integrated Proteomics Data
140. Integration of Omics Data for Drug Discovery

## **Evolutionary Biology**

141. Study of Molecular Evolution in Pathogens
142. Analysis of Evolutionary Conservation in Proteins
143. Comparative Analysis of Evolutionary Trees
144. Study of Evolutionary Adaptations in Extremophiles
145. Analysis of Gene Family Evolution
146. Study of Adaptive Evolution in Plant Genomes
147. Analysis of Evolutionary Rates in Different Lineages
148. Study of Evolutionary Mechanisms in Symbiotic Relationships
149. Analysis of Positive Selection in Genomes
150. Study of Evolutionary Dynamics in Viral Populations
151. Comparative Analysis of Evolutionary Genomics
152. Study of Convergent Evolution in Proteins
153. Analysis of Evolutionary Innovations in Metabolism
154. Study of Evolutionary Patterns in Developmental Genes
155. Analysis of Phylogeographic Patterns in Species
156. Study of Evolutionary Constraints in Genomes
157. Analysis of Evolutionary Relationships in Microbial Communities
158. Study of Molecular Evolution in Host-Pathogen Interactions
159. Analysis of Evolutionary Dynamics in Gene Networks
160. Study of Evolutionary History of Species Complexes

## **Computational Biology**

161. Development of Algorithms for Sequence Analysis
162. Computational Modeling of Biological Processes
163. Analysis of Biological Networks

164. Development of Machine Learning Models for Genomics
165. Study of Computational Approaches in Drug Design
166. Analysis of Computational Biology Pipelines
167. Development of Bioinformatics Workflows
168. Study of Computational Approaches in Systems Biology
169. Analysis of Computational Methods in Proteomics
170. Development of Software for Bioinformatics Analysis
171. Study of High-Performance Computing in Genomics
172. Analysis of Computational Methods in Transcriptomics
173. Development of Computational Tools for Structural Biology
174. Study of Computational Approaches in Metagenomics
175. Analysis of Big Data in Bioinformatics
176. Development of Computational Methods for Epigenomics
177. Study of Computational Approaches in Evolutionary Biology
178. Analysis of Computational Techniques in Biomedical Research
179. Development of Bioinformatics Algorithms for Data Integration
180. Study of Computational Approaches in Personalized Medicine

## **Biomedical Informatics**

181. Analysis of Electronic Health Records
182. Development of Clinical Decision Support Systems
183. Study of Biomedical Data Integration
184. Analysis of Patient Genomic Data
185. Development of Tools for Clinical Genomics
186. Study of Biomedical Text Mining
187. Analysis of Health Informatics Data
188. Development of Biomedical Databases
189. Study of Biomedical Image Analysis
190. Analysis of Clinical Trial Data
191. Development of Tools for Biomedical Data Visualization
192. Study of Biomedical Data Standards
193. Analysis of Genomic Medicine Data
194. Development of Tools for Health Data Analytics
195. Study of Computational Approaches in Healthcare
196. Analysis of Biomedical Data Security
197. Development of Personalized Medicine Informatics Tools
198. Study of Biomedical Data Privacy

199. Analysis of Biomedical Informatics in Disease Prevention
200. Development of Tools for Integrative Biomedical Analysis

This comprehensive list should provide plenty of ideas for beginners in bioinformatics, covering various categories and aspects of the field.