

CLINICAL BIOINFORMATICS

Module I: Basics of bioinformatics

1. Introduction to bioinformatics (Prof.Dr. Balázs Gyórrffy)
What is it good for? (Prof.Dr. Balázs Gyórrffy)
2. Utilization of a training and test set (Dr. János Tibor Fekete)
3. Statistical errors and dichotomania (Dr. János Tibor Fekete)
4. Survival analysis and Cox regression* (Prof.Dr. Balázs Gyórrffy)
5. ROC analysis: predicting sensitivity and specificity * (Dr. János Tibor Fekete)
6. Correlation (Dr. Otília Menyhárt)
7. Multiple hypothesis testing* (Prof.Dr. Balázs Gyórrffy)

Module II: Genomics and Transcriptomics

8. Introduction to sequencing (Prof.Dr. Balázs Gyórrffy)
9. Similar genes and proteins, BLAST (Prof.Dr. Balázs Gyórrffy)
10. Quality control* (Dr. Gyöngyi Munkácsy)
11. Alignment of data to a reference genome * (Dr. Gyöngyi Munkácsy)
12. Identifying mutations * (SNV, indels) (Dr. Gyöngyi Munkácsy)
13. Determining the consequence of a mutation * (Dr. Gyöngyi Munkácsy)
14. What is the clinical relevance of a mutation, ClinVar, dbSNP (Dr. Gyöngyi Munkácsy)
15. Copy number variations (Dr. Gyöngyi Munkácsy)
16. Identifying processing artifacts and quality issues (Dr. Otília Menyhárt)
17. Transcriptomics: processing RNA-seq data* (Prof.Dr. Balázs Gyórrffy)
18. GeneBank (Dr. Attila Marcell Szász)

Module III: Proteomics

19. Proteomics and transcriptomics: pre-processing (Prof.Dr. Balázs Gyórrffy)
20. Tools to analyze immunohistochemistry results (Dr. Gyöngyi Munkácsy)
21. Processing mass spectrometry (Dr. Áron Bartha) (video)
22. Understanding molecular functions, Uniprot (Dr. Gyöngyi Munkácsy)
23. Signal transduction, KEGG (Dr. Attila Marcell Szász)

Module IV: Artificial intelligence

24. Machine learning* (Dr. János Tibor Fekete)
25. The Bayes rule (Dr. János Tibor Fekete)
26. Principal component analysis (Dr. Áron Bartha) (video)
27. Determining distance* (Prof.Dr. Balázs Gyórrffy)
28. Clustering* (Prof.Dr. Balázs Gyórrffy)
29. Neuronal networks (Prof.Dr. Balázs Gyórrffy)
30. Clinical application of a decision tree (Dr. Áron Bartha) (video)
31. Variable selection strategies (Dr. Otília Menyhárt)
32. Support Vector Machines* (Dr. János Tibor Fekete)
33. Regression* (Dr. Otília Menyhárt)

Module V: Integrative science

34. Application of multi-omic tools (Dr. Otília Menyhárt)
35. Gene ontology (Dr. János Tibor Fekete)
36. Reproducibility issues in medicine (Dr. Otília Menyhárt)
37. Processing Chip-seq and ATAC-seq data * (Dr. Bálint László Bálint)
38. Processing DNA-methylation data (Dr. Bálint László Bálint)
39. Epigenetic databases (Dr. Bálint László Bálint)
40. Data mining: Excel, Pubmed, Watson (Dr. Gyöngyi Munkácsy)
41. Using REDcap (Dr. Attila Marcell Szász)
42. Time distortion and computer addiction (Dr. Otília Menyhárt)