



MASTER YOUR DIGITAL SKILLS

Introduction to Bioinformatics and Computational Biology

Data Analytics, data literacy & data driven decisions

Apostolos Zaravinos

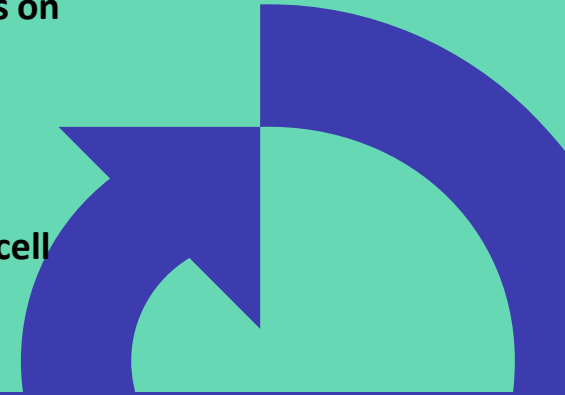


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COURSE OVERVIEW

The main objective of this course is to introduce students to basic Bioinformatics & Computational Biology tools so that they can apply them to the analysis of various genomes. Trainees will learn high throughput sequencing methodologies, with emphasis on RNA-seq quantification, during which they will learn to perform differential expression, FDR, GO, and GSEA analyses. Participants will also learn how to perform clustering and Dimension Reduction techniques, as well as various classification methods, including supervised learning, regression, regularization, KNN, random forest, SVM, and others. Participants will also learn modern techniques to measure DNA methylation and single-cell RNA-seq data.



OUR GOALS

1. Learn how to analyze FASTQ and FASTQC files and perform sequence alignment.
2. Learn how to perform RNA quality control & experimental design
3. Learn how to run differential expression using DESeq2
4. Learn how to perform FDR, GO, and GSEA analyses
5. Apply algorithms to perform hierarchical clustering and K means clustering and remove batch effects
6. Apply computational methods for Dimension Reduction
7. Utilize contemporary bioinformatics tools for classification
8. Apply algorithms to measure DNA methylation
9. Learn how to analyze single-cell RNA-seq files

COURSE DESCRIPTION

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- 1) Brief history of bioinformatics
- 2) Introduction to R
- 3) High-throughput sequencing technologies
- 4) RNA-seq Quantification
- 5) Differential expression, FDR, GO, and GSEA
- 6) Clustering
- 7) Dimension Reduction
- 8) Classification
- 9) Epigenetics, DNA methylation
- 10) Single-cell RNA-seq

COURSE INFO

Location	Asynchronous learning (offline)
Date	30.11.2024
Time	N/A
Duration	20 hours
Cost	This course is fully funded under the EU Level Up project



Apostolos Zaravinos

Dr. Apostolos Zaravinos is a Professor of Cancer Genetics and coordinator of the program “BSc in Biological Sciences” in the Department of Life Sciences at the European University Cyprus. He received his B.Sc. in Biology from the Department of Biology, University of Crete, and his Ph.D. in Medicine from the same University. He worked as Research Scientist at the Harris Birthright Research Center for Fetal Medicine, King’s College Hospital, and performed postdoctoral research in Cancer Genetics at the Molecular Medicine Research Center, University of Cyprus. Dr. Zaravinos holds a Specialisation in “Systems Biology” from the Systems Biology Center at Icahn School of Medicine, Mount Sinai, and another one in “Genomic Data Science” from the McKusick-Nathans Institute of Genetic Medicine, Johns Hopkins University. Since 2020 he has been included each year in the list of the world’s top 2% scientists, according to Stanford University.



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This document was produced in the course of the Level Up project, which received funding from the Digital Europe Programme (DIGITAL) of the European Union under Grant Agreement no 101100679.

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