

The 7th Haifa Winter Omics Workshop

Multi-omics and machine learning workshop

	Sunday 14/2/2021	Monday 15/2/2021	Tuesday 16/2/2021	Wednesday 17/2/2021	Thursday 18/2/2021
Lecture zoom link: https://us02web.zoom.us/j/87944426819					
08:30-10:30	Getting the data: Why perform a multi-omics experiment, experimental design, assay biases; An introduction to the course dataset (Chronic Lymphocytic Leukemia) (Daniel)	Ordination: Assay matrices, ordination methods (exploratory, interpretive, discriminatory), supervised (mixOmics) and unsupervised (MOFA) multi-omics applications (Daniel)	Networks: Describe network properties, survey types of networks used for omics-derived biological data. Using network methodology to integrate multiple datasets and test hypotheses. (Maya)	Machine learning: ML principles and application to multi-omics / SVM, random forest, neural nets (Eyal)	Dataset combination and bias correction; Visualization (Daniel)
10:30-11:00	Coffee break				
11:00-13:00	Linear models: Old-school statistical approaches, e.g. differential expression analysis (Eyal)	<i>Guest lecturer:</i> Elhanan Borenstein (Tel Aviv University Computer Science and Medicine) Multi-omics and model-based analysis of the human microbiome	<i>Guest lecturer:</i> Ron Shamir (Tel Aviv University School of Computer Science) Methods for computational analysis of multiple 'omics' to understand cancer	<i>Guest lecturer:</i> Alal Eran (Ben-Gurion University Life Sciences, Harvard Medical School) Multimodal dissection of the autism spectrum	<i>Guest lecturer:</i> Alon Diamant & Tal Shor (MyHeritage Ltd.) State of the art ancestry inference using machine learning at MyHeritage
13:00-14:00	Lunch				
Tutorial zoom link: https://us02web.zoom.us/j/82551570423					
14:00-16:00	Tutorial: Quality inspection and quality filtering Data exploration, quality filtering, missing data, normalization, scaling (Tal)	Tutorial: Ordination Multi-omics ordination / MOFA (Tal)	Tutorial: Network analysis Network-based clustering of multi-omics data / SNF (Osnat)	Tutorial: Machine learning Random forest classifier (Mark)	Tutorial: Additional ordination methodologies t-SNE / UMAP (Maya)
16:00-16:30	Coffee break				
16:30-18:30 Extra tutorials	Tutorial (continued)	Tutorial (continued)	Tutorial (continued)	Tutorial (continued)	Tutorial (continued)