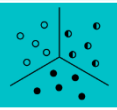
Bioinformatics course:
Genomes, genes & gene expression

Week #		Project	Description	Methods
1		**Origins of SARS-CoV-2**: Finding relatives	Compare genomic sequences of SARS-CoV-2 with other viral genomes and determine similarity.	Generating data analysis workflows Pairwise DNA sequence alignment
2		**Origins of SARS-CoV-2**: Building family tree	Compose a phylogenetic tree of similar sequences and determine phylogenetic distance.	Multiple sequences alignment Phylogenetic tree building & visualization
3		**Attack the virus!** Targeting conserved regions	Find parts of the virus that don't mutate much.	DNA & protein sequences alignments Data representation
4		**Say NO to drugs!** Antibiotic resistance	Assemble the genome of bacteria and determine the location of antimicrobial resistance (AMR) genes.	Quality control Genome assembly Read mapping to reference genome
5		**Personalized medicine**: Cancer causing mutations	Analyze human genetic variants and determine which ones have a role in cancer.	Annotation of variants Working with reference databases
6		**Gut metaverse**: Community	Determine what types of bacteria are present in a single sample.	Classification algorithms using Operational Taxonomic Units (OTUs)
7		**Gut metaverse**: Diversity	Statistically analyze bacterial diversity within and between samples.	Diversity analysis of metagenomic samples - statistics & visualizations
8		**Did you just assume my type?** Confirming cell identity	Determine the type of cell produced by stem cell differentiation experiment via gene expression.	Single cell transcriptomic (scRNA) analysis
9		**Grow some seeds**: Gene expression profiling	Discover which genes are important for corn seed development.	Gene network construction & analysis
10		**Building living machines**! Synthetic biology basics	Build and evaluate the design of a genetic logic scheme to make the cell do what you want.	Designing & visualizing genetic circuits
11		**Final project**: Build your own tool	Individually or in a group of 2 people develop a bioinformatic tool, contribute it to the Bioconda integrated environment and document it.	Using Git tools Documentation of a project
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