

Day	Session	Time	Format	Topics	Lecturer	
8 th September	Registration	8:30 - 9:00				
	Computation in life	9:00 - 9:45	Lecture	Life as an information system, the cell as a computational unit	Ivan Erill (UMBC)	
		9:50 - 10:45	Lecture	Algorithms: representation, data structures and optimization	Ivan Erill (UMBC)	
		10:45 - 11:00	<i>Coffee break</i>			
	Bioinformatics resources	11:00 - 11:25	Lecture	Bioinformatics repositories, primary vs. derivative repositories	Ivan Erill (UMBC)	
		11:30 - 13:00	Lecture	alignment, dynamic programming, search strategies, BLAST	Cédric Notredame (CRG)	
		13:00 - 14:00	<i>Lunch</i>			
	Hands-on bioinformatics	14:00 - 14:45	Hands-on	Guided exercises on main bioinformatics repositories, BLAST flavors	Ivan Erill (UMBC)	
		14:50 - 15:45	Coding	Linux environment, Python, lists, versioning	Ivan Erill (UMBC)	
		15:45 - 16:15	<i>Coffee break</i>			
16:15 - 18:00		Coding	Scripting remote queries using the NCBI API	Ivan Erill (UMBC)		
9 th September	Functional genomics	9:00 - 9:50	Lecture	Sequence orthology, reciprocal BLAST, functional annotation, HHMER, COG & eggNOG, functional categories	Toni Gabaldon (CRG)	
		10:00 - 10:25	Hands-on	Guided exercises with the eggNOG database	Toni Gabaldon (CRG)	
		10:30 - 11:45	Coding	Scripting the assignment and analysis of NOG identifiers	Toni Gabaldon (CRG)	
		11:45 - 12:00	<i>Coffee break</i>			
	Gene Ontology analysis	12:00 - 12:35	Lecture	Ontologies and databases, the gene and evidence ontologies, enrichment and overrepresentation	Alex Sánchez-Pla (UB)	
		12:35 - 13:00	Hands-on	Gene set enrichment and overrepresentation analyses with GO	Alex Sánchez-Pla (UB)	
		13:00 - 14:00	<i>Lunch</i>			
	Gene Ontology analysis	14:15 - 15:45	Coding	Scripting the assignment and analysis of GO identifiers	Alex Sánchez-Pla (UB)	
		15:45 - 16:30	Lecture	Systems and network biology, directed and acyclic graphs, in- and out-degree, hubs and critical paths	Baldo Oliva (UPF)	
		16:30 - 16:45	<i>Coffee break</i>			
	16:45 - 17:15	Hands-on	Exercises with STRING and Cytoscape	Baldo Oliva (UPF)		
	17:15 - 18:30	Coding	Scripting remote STRING queries	Baldo Oliva (UPF)		