



Introduction

Bioinformatics and Comparative Genome Analyses

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Course web page: <http://www.pasteur.fr/~tekaia/BCGA2011.html>

EMBO Bioinformatic and Comparative Genome Analyses Course
Institut Pasteur Paris
June 27 - July 9, 2011

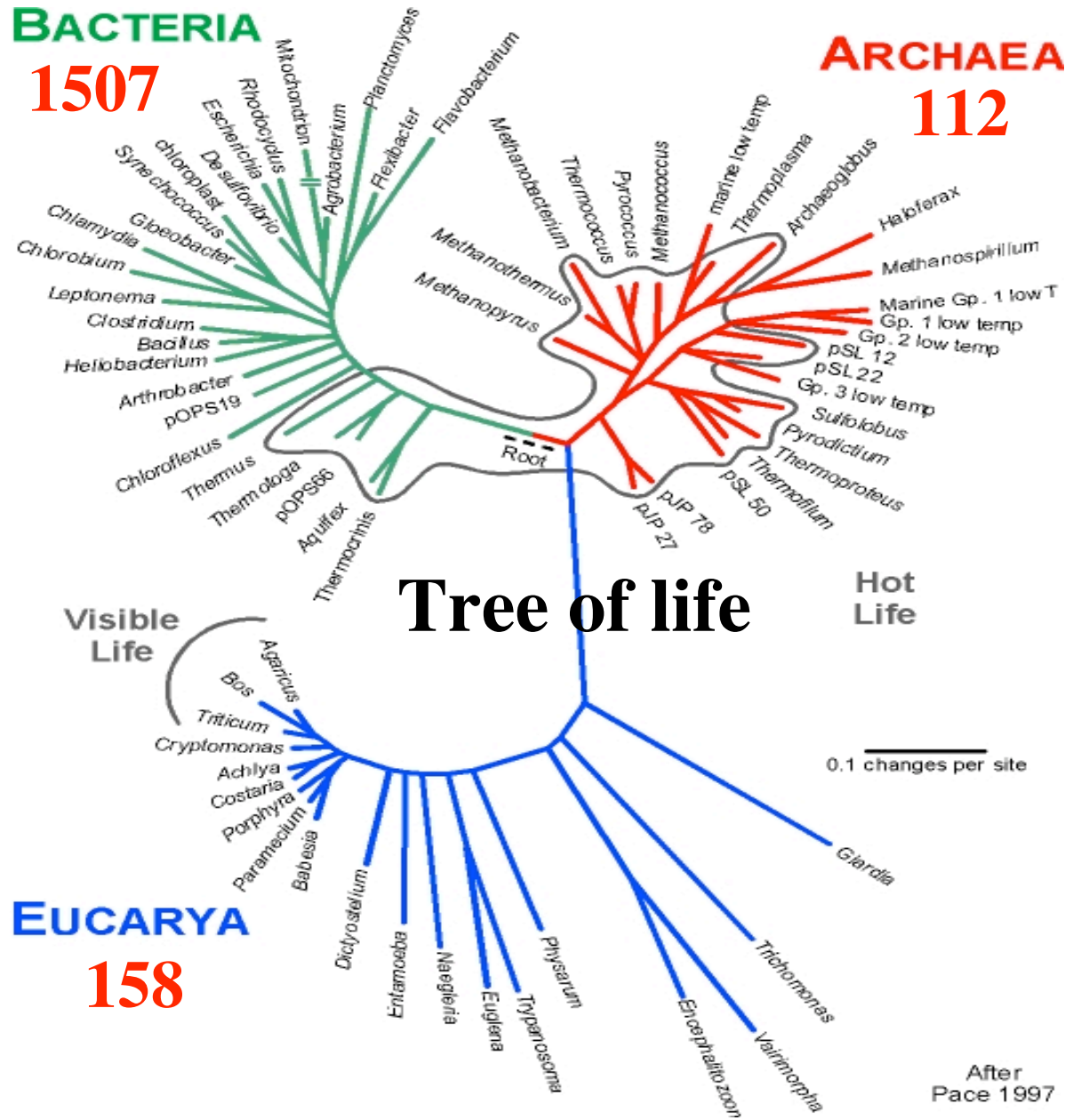
Why this course ?

BACTERIA

1507

ARCHAEA

112



EUCARYA

158

Complete genomes

10355 projects

• 1777 published

(2011/06/13)

Ongoing:

• 6037 Bacteria

• 199 Archaea

• 2007 eukaryotes

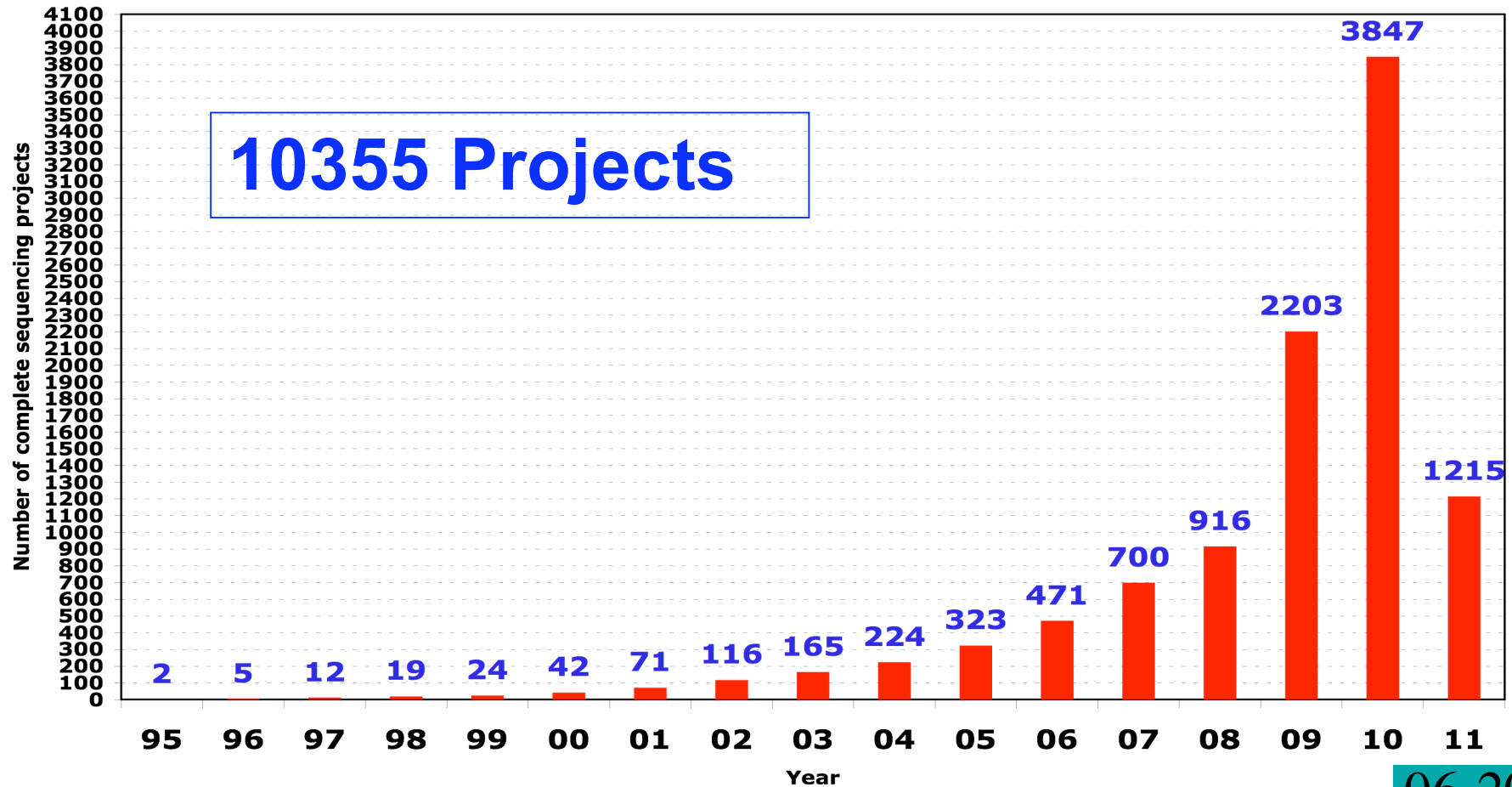
• 323 metagenomes

• 3 phylogenetic domains;

• Lifestyles: mesophiles; (hyper)thermophiles; psychrophiles; extremophiles,...

GOLD: <http://www.genomesonline.org/>

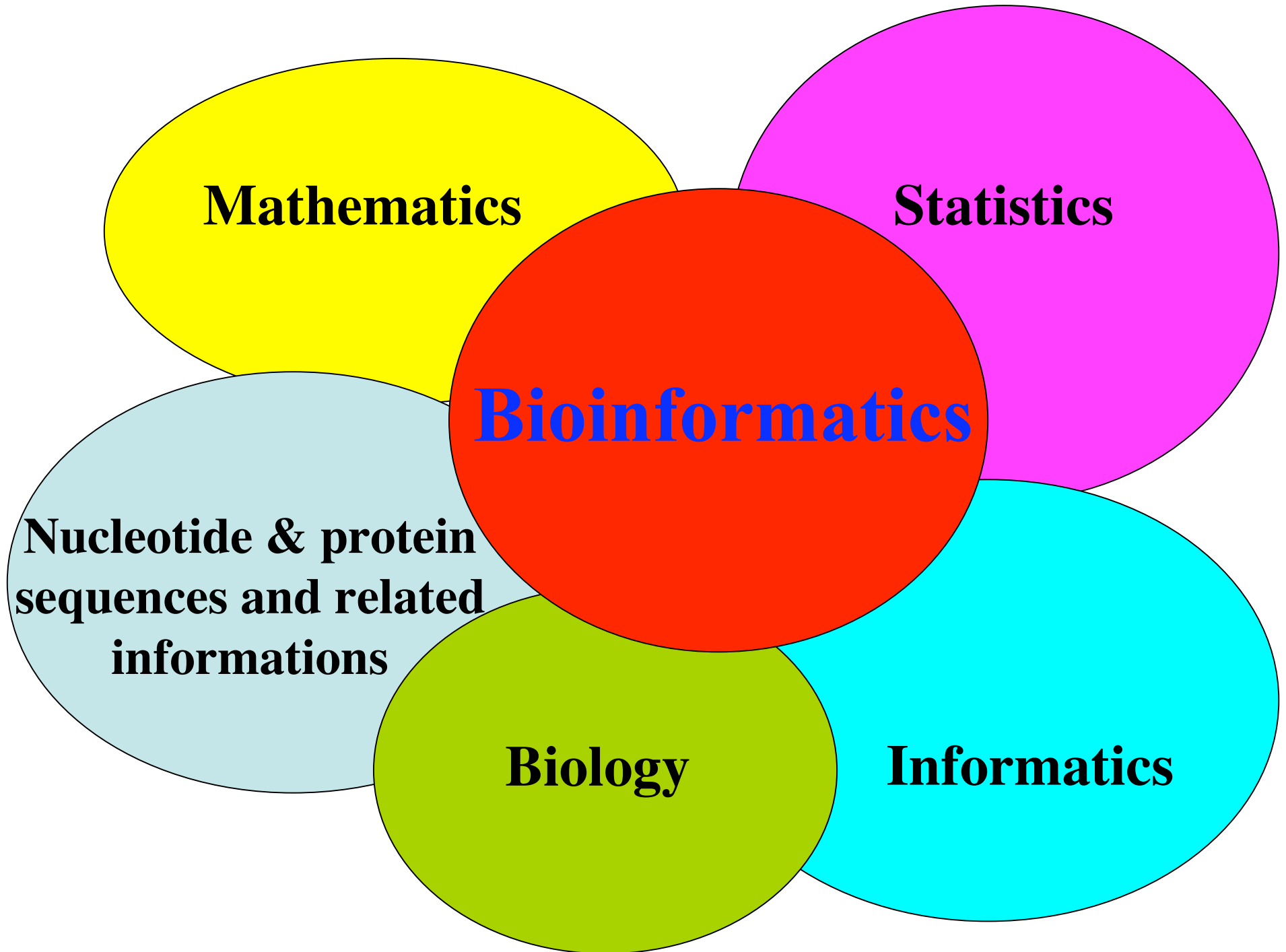
Evolution of the number of complete genome sequencing projects



06-2011

Complete sequencing genomes span the three domains of life

<http://www.genomesonline.org/cgi-bin/GOLD/bin/gold.cgi>



Mathematics

Statistics

Bioinformatics

**Nucleotide & protein
sequences and related
informations**

Biology

Informatics

Bioinformatics and Comparative Genome Analysis

The main objectives of the course are to familiarize participants with bioinformatics and large scale genome data analyses skills by introducing:

- 1- advanced fundamental algorithms used in Bioinformatics;**
- 2- their application in genome analyses;**
- 3- recent knowledge acquired from genomes studies and their perspectives.**

Main Lecture/practical topics include:

- Genomes comparisons - evolution
- Technical aspects - writing scripts;
- Available genomes;
- Methods applied to families of genes/proteins:
multiple alignments, phylogeny analyses, motifs search (genome/gene);
- Determination of families of paralogs - of orthologs
- Genomes alignments;
- Genome visualization (Circos);
- Genome Wide Association Studies.
- Protein-Protein Interactions;

Week 1 (June 27 - July 9): Bioinformatics and Genome Analyses I

Day	Date	9H00-10H30	11H00-12H30	14H30-16H00	16H30-18H00	18H00-19H00
Sunday	June 26			Hotel check in	Hotel check in	Hotel Check in
Monday	June 27	Course Introduction and overview Fredj Tekaia Students self introduction	Computer Environment Introduction Tru Huynh Institut Pasteur Paris	Whole Genome Databases Fredj Tekaia Institut Pasteur Paris	Whole Genome Databases - Bibliographic Resources Fredj Tekaia Institut Pasteur Paris	Extension - QA
Tuesday	June 28	Large-scale Genomes Comparisons Fredj Tekaia Institut Pasteur Paris	Large-scale Genomes Comparisons Fredj Tekaia Institut Pasteur Paris	Large-scale Genomes Comparisons Fredj Tekaia Institut Pasteur Paris	Large-scale Genomes Comparisons Fredj Tekaia Institut Pasteur Paris	Oral Presentations
Wednesday	June 29	Genomes Visualization with circos Martin Krzywinski Genome Sciences Centre, Vancouver - Canada	Genomes Visualization with circos Martin Krzywinski Genome Sciences Centre, Vancouver - Canada	Genomes Visulatization with circos Martin Krzywinski Genome Sciences Centre, Vancouver - Canada	Genomes Visualization with circos Martin Krzywinski Genome Sciences Centre, Vancouver - Canada	Oral Presentations
Thursday	June 30	Multiple Sequence Alignments Aidan Budd EMBL, Heidelberg - Germany	Multiple Sequence Alignments Aidan Budd EMBL, Heidelberg - Germany	Phylogenetic Trees Construction Aidan Budd EMBL, Heidelberg - Germany	Phylogenetic Trees Construction Aidan Budd EMBL, Heidelberg - Germany	Oral Presentations
Friday	July 1st	Whole Genomes Alignments Inna Dubchak Genomic Division Lawrence Berkeley National Laboratory Berkeley, CA - USA	Whole Genomes Alignments Inna Dubchak Genomic Division Lawrence Berkeley National Laboratory Berkeley, CA - USA	Whole Genomes Alignments Inna Dubchak Genomic Division Lawrence Berkeley National Laboratory Berkeley, CA - USA	Orthologs Prediction and Classification Christophe Dessimoz ETH, Zurich - Switzerland	Extension - QA
Saturday	July 2	Orthologs Prediction and Classification Christophe Dessimoz ETH, Zurich - Switzerland	Orthologs Prediction and Classification (Practical) Christophe Dessimoz ETH, Zurich - Switzerland			
Sunday	July 3	Free				

Week 2 (July 4 - July 9): Bioinformatics and Genome Analyses II

Day	Date	9H00-10H30	11H00-12H30	14H30-16H00	16H30-18H00	18H00-19H00
Monday	July 4	Genome Wide Association Studies Ahmed Rebai Centre Biotechnology Sfax - Tunisia	GWAS Ahmed Rebai Centre Biotechnology of Sfax - Tunisia	GWAS Ahmed Rebai Centre Biotechnology of Sfax - Tunisia	GWAS Ahmed Rebai Centre Biotechnology of Sfax - Tunisia	Oral Presentations
Tuesday	July 5	Imputation and Meta-analysis of GWAS Kalliope Panoutsopoulou Sanger Institute, Cambridge - UK	Association Testing and Meta-analysis of GWAS Kalliope Panoutsopoulou Sanger Institute, Cambridge - UK	Comparative Genomics and Dynamics of DNA Repeats in Eukaryotes Guy-Franck Richard Institut Pasteur Paris	Oral Presentations Participants	Oral Presentations
Wednesday	July 6	Methods for Repeat Detection in Nucleotide Sequences (Review) Gary Benson Boston University - USA	Methods for Repeat Detection (Practical) Gary Benson Boston University - USA	Next Generation Sequencing: read mapping algorithms Gary Benson Boston University - USA	Next Generation Sequencing: read mapping algorithms Gary Benson Boston University - USA	Extension - QA
Thursday	July 7	Eukaryotic Genomes Bernard Dujon Institut Pasteur Paris	Eukaryotic Genomes Bernard Dujon Institut Pasteur Paris	Realistic Models and Efficient Algorithms in Bioinformatics/Biophysics Analyses of Genomes Edouard Yeramian Institut Pasteur Paris	Ancient and Recent Evolution in Vertebrate Genomes Hugues Roest Crolius Institut de Biologie - Ecole Normale Supérieure Paris - France	Extension - QA
Friday	July 8	-Human Protein-Protein Interactions -Human Gene and Protein Networks Landscape Javier de Las Rivas Bioinformatics & Functional Genomics, Salamanca - Spain	PPI - HGPNL Javier de Las Rivas Bioinformatics & Functional Genomics, Salamanca - Spain	PPI - HGPNL Javier de Las Rivas Bioinformatics & Functional Genomics, Salamanca - Spain	PPI - HGPNL Javier de Las Rivas Bioinformatics & Functional Genomics, Salamanca - Spain	Social activities
Saturday	July 9	Course evaluation Organizers and Students	Course evaluation Organizers and Students	Free	Free	Free
Sunday	July 10	Hotel check out				

Thanks



Institut Pasteur