

5. Phylogenetic trees

- The tree of life
- The tree, an abstract object
- Building an array of distances
- The UPGMA algorithm
- Differences are not always what they look like
- The diversity of bioinformatics algorithms
- **The application domains in microbiology**

Many domains of mathematics and informatics are involved

- Algorithms on
 - character strings
 - trees
 - networks
- Probability and statistics
- Optimisation methods
- Constraint satisfaction
- Automata and formal grammars
- Signal processing

From algorithms to software

- Software development
- User interfaces
 - Data visualization
- Databases

Biotechnology

- Bioproduction
 - Biofuels
- Biotransformation
- Bioremediation

- Improving the understanding of production strains
 - From the genome to the metabolome
- Comparing strains

Human and animal health

- Design of
 - Vaccines
 - Antibiotics
 - Antivirals
- Identification of resistance markers
- Epidemiology

Personal care

- Metagenomics
 - Antidandruff shampoo
 - Toothpaste
 - ...
- Probiotics

Agrofood

- Diagnostics
 - Pathogenicity
- Improving fermentation processes

And
sequencing technologies,
computing technologies,
bioinformatics
are still progressing!

BIOINFORMATICS: GENOMES AND ALGORITHMS

Computer analysis of genetic information

François
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