InfoLife

cini national lab

Formal Methods and Algorithms for Life Sciences

TRAINING RESEARCH DEVELOPMENT

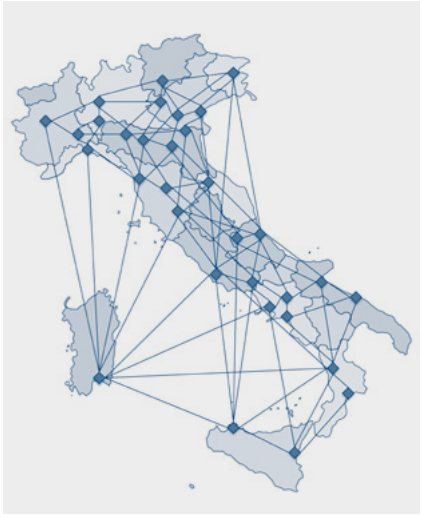
Networking 35 Research Units

CONNECTING YOUR BUSINESS TO THE RESEARCH RESOURCES YOU NEED

The InfoLife laboratory includes 35 groups from Italian Universities for a total of more than 200 professors and researchers plus an equal amount of PhD students and post-docs.
Each group is a "node" of the lab.
The number of research topics covered by the lab nodes is huge and allows to provide high-level research contributions in practically any area of the Systems Biology and Bioinformatics domain.

YOUR IDEAL PROJECT PARTNER

The InfoLife laboratory can participate in National and International funded projects. The CINI consortium is able to take care of all the administrative parts of the project, while being able to potentially provide an unlimited amount of man-hours and co-funding opportunities.



Computer science for your life science research

MANY DIFFERENT AREAS OF EXPERTISE

- Models and Formalisms - describing a computationally-friendly biology
- Algorithms - optimal algorithms to address hard computational challenges
- Data-mining - advanced knowledge mining from biological data
- Infrastructures - all the necessary tools to provide services
- Complex Systems - the holistic view on Life Sciences to discover emerging properties

COVERING SEVERAL APPLICATION DOMAINS

- Sequences - genome assembly, analysis of philogenetic distances, coding and regulatory regions, transcription factors, gene structure, functional annotation
- Populations - modelling of cellular populations dynamics and their interactions
- Prediction - function and structure of proteins, biological polimers, DNA and RNA at different functional levels (coding, regulation, inhibition, promotion, transcription, translation, expression, epigenetics)
- Networks - study and analysis of regulatory networks, interaction networks, metabolic networks, and all those biological phenomena that can be modeled by a network
- Clinical Data - biomedical, biochemical, medical images from different possible sources and biosensors types

WHERE ENGINEERS AND LIFE SCIENTISTS MEET

- Understanding the extreme complexity of the machinery of life should not be a task left to biologists but it should be instead a multidisciplinary effort. The typical bottom-up approach followed by biologists lacks generality as much as the engineers' top-down approach lacks specificity. The optimal solution is probably a new modus operandi able to integrate specific observations made by biologists with functional modeling as seen in engineering. Systems and computational biology aren't just the latest fashion in biology; they are a necessary step to overcome the limitations of top- and bottom-down approaches and find a middle ground. Starting from high-level hypotheses and models, systems and computational biology should drive the experimentation and laboratory phases, establishing a loop that could contain the best advantages of both approaches, while overcoming most of their limitations.

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