

Omics Integration and Systems Biology

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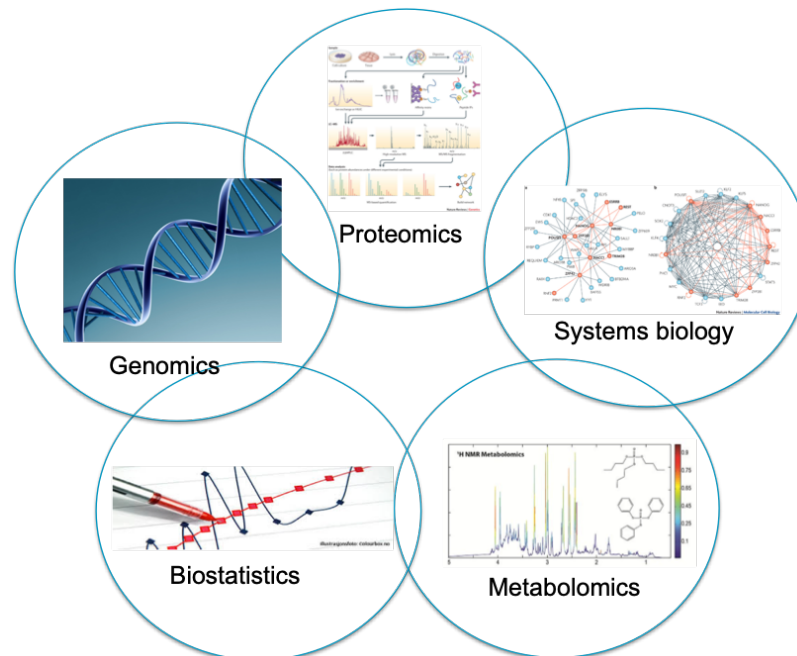
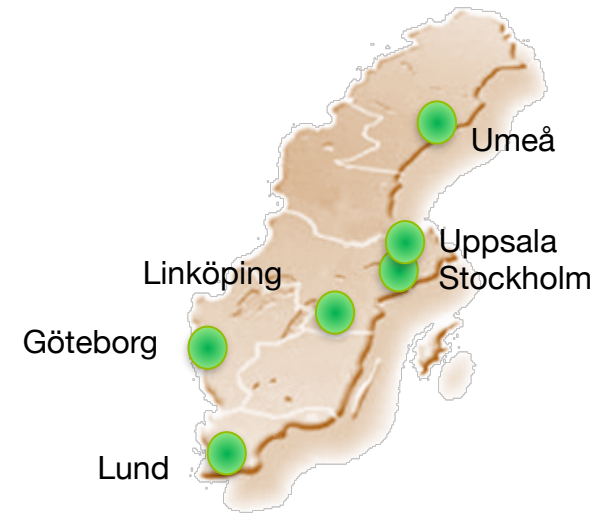
National Bioinformatics Infrastructure Sweden - NBIS

NBIS is the Swedish node of ELIXIR

Support

Infrastructure

Training



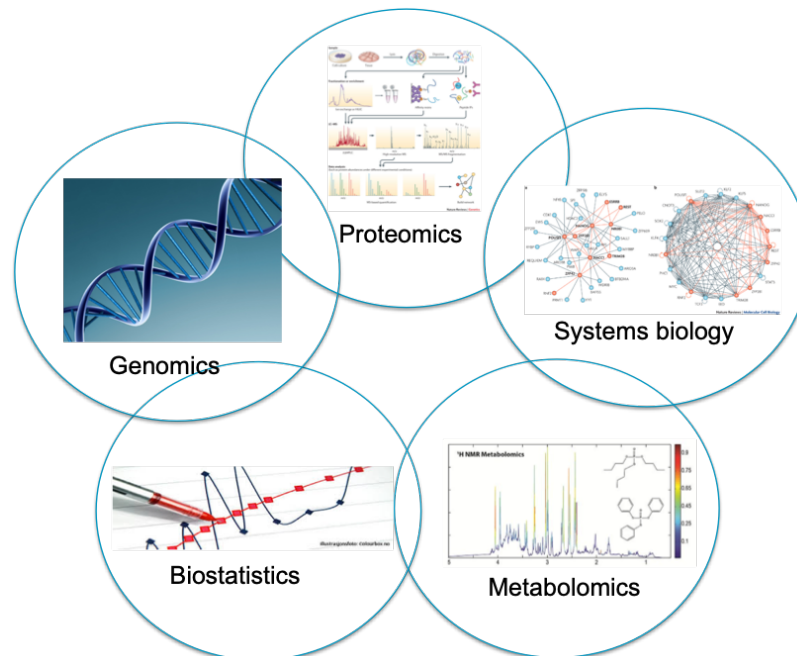
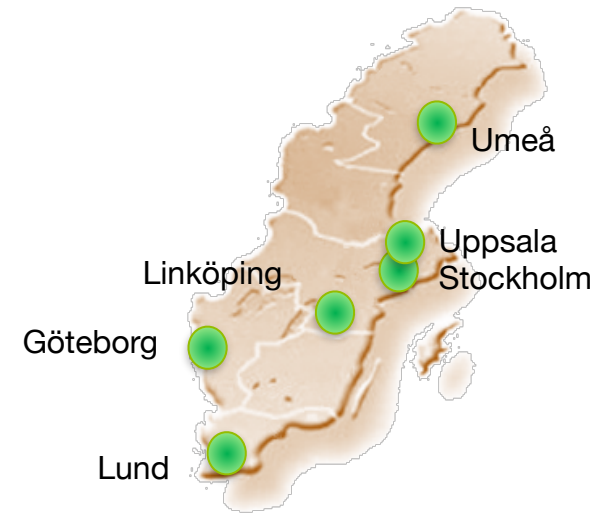
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The image shows the top section of the NBIS website. The header features the NBIS logo in green and orange, a navigation menu with links for Support, Infrastructure, Training, News, Events, and About, and the SciLifeLab logo. The main banner has a dark blue background with a large orange NBIS logo and the text 'NATIONAL BIOINFORMATICS INFRASTRUCTURE SWEDEN'. Below this, a white text box states: 'NBIS is a distributed national bioinformatics infrastructure, supporting life sciences in Sweden'. A central orange circle with a white downward arrow indicates a dropdown menu. The main content area below the banner consists of three green boxes, each with an icon and a title: 'Support' (people icon), 'Infrastructure' (gear icon), and 'Training' (graduation cap icon). Each box contains a brief description of the services provided.

NBIS
NATIONAL BIOINFORMATICS
INFRASTRUCTURE SWEDEN

NBIS is a distributed national bioinformatics infrastructure, supporting life sciences in Sweden

Support
Support services ranging from short consultation, consultancy to long-term embedded bioinformaticians.

Infrastructure
Providing infrastructure in the form of services, computational resources, tools and guidelines to the life science community.

Training
Training events in advanced and applied bioinformatics.

Omics Integration and Systems Biology course

Main themes

- Data Management
- Machine Learning
- Network Topology
- Metabolic Modelling

Method

- Lectures
- Hands-on sessions
- Guest seminars

Omics Integration and Systems Biology course

Omics Integration and Systems Biology

9 - 12 September 2019, SciLifeLab, Tomtebodavägen 23A, 171 65 Stockholm

Overview

Course open for PhD students, postdocs, and researchers looking for an introduction to multi-omics integration and systems biology.

The aim of this workshop is to provide an integrated view of biological network construction and integration, constraint-based modelling, multi-omics integration and data-driven hypothesis generation. A general description of different methods for analysing different omics data (e.g. transcriptomics and genomics) will be presented with some of the lectures discussing key methods in omics integration. The various techniques are discussed in terms of their rationale and applicability, with a particular focus on possible confounding factors. Many of the techniques presented in the workshop may be applied to different omics (e.g. transcriptomics, genomics, proteomics, metabolomics). Attendants will further get hands-on experience in their application.

Some of the covered topics include:

- Data management in omics studies;
- Condition-specific and personalized metabolic modeling based on integration of transcriptomic and proteomic data;
- Identification of potential biomarkers and targetable genes;
- Identification of key biological functions and pathways (e.g. gene set enrichment analysis);
- Co-expression and association networks, gene modules, and network topology analysis;
- Multi-omics integration, clustering and dimensionality reduction;
- Application of key machine learning methods for multi-omics analysis.

Learning objectives

At the end of the course, students should:

- Be able to integrate different omics and simulate biological functions using constraint-based models and [FBA](#).
- Build biological networks based on different omics data, as well as integrated multi-omics networks, and perform basic topology analyses.
- Identify key methods for analysis and integration of omics data based on a given dataset.
- Be aware of important confounding factors and sources of bias.

Omics Integration and Systems Biology course

[Overview](#)[Schedule](#)[Syllabus](#)[Reading materials](#)[Software](#)[Practical information](#)

Course schedule

9 - 12 September 2019

SciLifeLab, Tomtebodavägen 23A, 171 65 Stockholm. Room: Air, Alfa 2

Monday 2019-09-09

08.45 - 09.00 Pre-course coffee

09.00 - 09.20 Welcome ([Rui](#), [Ashfaq](#), [Nikolay](#))

09.20 - 10.00 Omics Data Management ([Ashfaq](#))

10.00 - 10.15 Break

10.15 - 12.00 Intro, Supervised methods ([Nikolay](#), [lecture](#) and [feature selection notes](#))

12.00 - 13.00 Lunch at [Nanna Svartz](#)

13.00 - 15.00 Workshop: Supervised methods ([Nikolay](#))

15.00 - 15.15 Coffee Break

15.15 - 17.00 Unsupervised methods ([Nikolay](#), [lecture](#) and [dimensionality reduction notes](#))

Tuesday 2019-09-10

09.00 - 10.45 Workshop: Unsupervised methods ([Nikolay](#))

10.45 - 11.00 Coffee Break

11.00 - 12.00 Intro to biological network analysis and terminology ([Rui](#), [lecture](#))

12.00 - 13.00 Lunch at [Nanna Svartz](#)

Practical questions: ruibenfeitas@scilifelab.se