Upcoming BioSB Courses

■ **Multi-Omics and Data Sciences in Complex Diseases.**

Maastricht, 23 – 27 September 2024
Course website – Registration
Or see next page for a short description.

<mark>Early bird discount until July 29</mark>

■ **Computational Metagenomics (advanced course)**

Wageningen, 14 – 16 October 2024
Course website – Registration
Or see next page for a short description.

<mark>Early bird discount until August 19</mark>

■ **Single-cell analysis**

Erasmus Rotterdam, 29 Oct. – 01 Nov. 2024
Course website – Registration
Or see next page for a short description.

■ **Integrated Modeling and Optimization (Fundamental course)**

Wageningen, 09 – 13 December 2024
Course website – Registration
Or see next page for a short description.

<mark>Early bird discount until October 14</mark>

■ **Constraint-based modeling**

Wageningen, 10 – 14 February 2025
Course website – Registration
Or see next page for a short description.

<mark>Early bird discount until December 16</mark>

Upcoming BioSB HotTopic Symposium

■ **Bioinformatics methods for pathogen surveillance**

Amsterdam, October 2024 (Afternoon)

Hot topics website – Registration
Registration is for **FREE**!
Please take your registration seriously. No show = Unnecessary and unforeseen costs!

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BioSB − Short introduction of the courses

Multi-Omics and Data Sciences in Complex Diseases (23-27 Sept 2024)

Many diseases are complex, their polygenic nature combined with gene-environment interactions leads to a situation where single omics are insufficient to both understand the biology and to make reliable diagnostic or prognostic predictions. This course will cover advanced multi-omics screening technologies and look at how we use cutting edge data science to make sense of our measurements and bring explainability to our predictions, which will ultimately lead to hypothesis generation and furthering biological understanding.

Computational Metagenomics (14-16 Oct 2024)

This course teaches state of the art computational methods for the analysis of metagenomic data. Lectures will be combined with hands-on computer sessions using Linux command line tools, Galaxy and R to practice use of the methods on real data. First, the fundamentals are discussed, then the topics are explored in depth with lectures by experts and practical exercises with real data.

Single Cell Analysis (29 Oct – 01 Nov 2024)

This course features a mix of lectures and practicals, and you will have the opportunity to perform hands-on analysis of scRNA-seq data in R. Topics to be covered in the course include (but not limited to): an overview of different single cell platforms, experimental design, preprocessing of scRNA-seq data, normalization, dimensionality reduction, clustering, batch correction, differential expression, trajectory inference.

Integrated Modeling and Optimization (9-13 Dec 2024)

In validating models one always meet with the need to fit models to data. So, the parameters that are present in any realistic model have to be chosen based on comparison of model predictions with data. In this matching process optimization techniques are indispensable. That's why a considerable part of this course is spent on getting you acquainted with the optimization techniques that are nowadays available and widely used. Numerical optimization also is the basis for so-called flux balance analysis (FBA), commonly used to study large metabolic networks. This type of models and their analysis and simulation is also introduced in the course.

Constraint based modeling: Introduction and advanced topics (10-14 Feb 2025)

This course will introduce computational modeling of large (genome-scale) metabolic reaction networks through a scalable framework known as constraint-based modeling. Emphasis will be on the usage in both biotechnology and systems biomedicine. Main topics will be fundamental constraint-based modeling methods, omics data integration, multi-scale modeling and microbial community modeling. The course will combine theoretical lectures with tutorial exercises and computational exercises in Python.

Have a great summer! Best wishes, Petra