

# Workshop in Omics Integration and Systems Biology

19 - 23 April 2021  
Online



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# Individual presentations

**Cameras on please!**

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**What do you view as multi-omics integration?**

# Themes

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- **Machine learning methods in integration**
- **Biological network analysis**
- **Genome-scale metabolic modeling**
- **Gene-set centric analysis and reporter features**

# Overview: Machine learning in integrative omics

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## Advantages and pitfalls in integration

### Supervised omics integration

### Unsupervised omics integration

- Feature projection on latent space
- NMF

### Deep Learning

### Integration in single-cell

- UMAP and graph abstractions

# Overview: Network Analysis

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## Biological Network topology

- Network inference and Community analysis

## Network meta-analysis

## Similarity network fusion

# Overview: Genome-scale metabolic modeling

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## Metabolic Modeling

- Simulation with GRN as scaffolds
- Metabolism-driven integration

## Metabolism-associated omics analysis

- GSEA from GSMM
- Reporter metabolite analysis

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# Invited talks

# Invited seminars

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**Dr. Evangelia Petsalaki, EMBL-EBI, UK**

"Data-driven approaches towards studying context-specific cell signalling"



# Invited seminars

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**Dr. Jonathan Robinson**, BioInnovation Institute, DK

"The evolution of human Genome Scale Metabolic models"



# Invited seminars

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**Dr. Francesco Gatto, Elypta, SE**

"Systems biology approaches for translational cancer research"



# Invited seminars

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**Dr. Mihail Anton, NBIS, SE**

“The open source ecosystem for genome-scale metabolic models”



# Resources

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Lectures will be recorded

Slides and scripts: Schedule

Specific instructions: HackMD

Workshops: HackMD

Questions / Bugs?: HackMD



- ▼ Channels +
- # exercises-bugs-typos
- # general
- # installation
- # omics-integration-course

General questions after the course

Installation issues

# Organization

## Exercises & Assisted Exercises

## Attendance

## Feedback (short and long)



Overview   Schedule   Labs   Reading materials   Pre-course   Contact

### Course schedule

This page is under update.

🕒 - lecture; 🎓 - hands-on workshop; 🎤 - invited seminar; ⏱ - break

#### Before the course

Prepare [Pre-course materials](#) and pre-processing introduction ([notebook, html](#)).

#### Day 1

09.00 - 09.20 🕒 Introduction and contextualization ([Rui](#))

09.20 - 09.55 🕒 Machine Learning view of Omics integration ([Nikolay, slides](#))

09.55 - 10.05 ⏱ Break

10.05 - 10.55 🕒 Feature Selection and Supervised Omics integration ([Nikolay, slides](#))

10.55 - 11.00 ⏱ Break

11.00 - 12.00 🎓 Feature Selection and Supervised Omics integration ([Nikolay, feature selection notebook, supervised integration notebook](#))

12.00 - 13.00 ⏱ Lunch

13.00 - 13.10 🕒 Lab recap ([Nikolay](#))

13.10 - 14.00 🕒 Unsupervised Omics integration ([Nikolay, slides](#))

