# Bases of Bioinformatics for Physician-Scientists: From Clinical Questions to Multi-Omics Integration: Summer Workshop

Residents only | 17-19 June 2026 | Milan, Italy

## Description

This three-day course offers physician-scientists a comprehensive introduction to bioinformatics approaches in clinical research. Led by an international faculty of renowned experts, our course combines theoretical foundations with hands-on sessions to bridge the gap between clinical practice and computational biology.

Participants will explore the latest developments in AI for multi-omics data analysis (including transcriptomics, metabolomics, and single-cell technologies) and learn how to navigate the major clinical databases. Special emphasis is placed on translational aspects, with real-world applications in skin barrier dysfunction, microRNA analysis, and spatial biology. The program includes an interactive discussion panel addressing participants' specific research challenges and introduces the NETSKINMODELS European Network initiative for skin engineering and modeling.

Prerequisites: Basic computer literacy; no prior programming experience required.

Two weeks before the start of the course, all participants will submit one research question. On the last day of the course, the speakers will deliver a solution to each research question.

## Learning Objectives

Following this course, the attendee should be able to:

1. Multi-Omics Understanding and Analysis
   a. Interpret different types of omics data (e.g., genomics, transcriptomics, metabolomics)
   b. Navigate and use major bioinformatics databases and analysis tools
2. Big Data Management in Clinical Research
   a. Recognize the challenges and opportunities of big data in dermatology
   b. Understand AI and machine learning applications in clinical dermatology
3. Using Skin Models and Systems Biology
   a. Compare different 3D skin models and their applications
   b. Understand skin barrier dysfunction modeling
   c. Evaluate the integration of multi-omics data in skin modeling

## Faculty

Chairs:     Giovanni Damiani
Speakers:   Andrea Tangherloni, Sandrine Dubrac, Eniko Sokoly, Alexander Zink
Tutors:     Francesca Buffa, Pietro Lio, Federico Borra

## Wednesday, 17 June 2026

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|---|---|
| 14:00 – 15:00 | Course Introduction<br>Giovanni Damiani |
| 15:00 - 16:00 | AI and modelling in clinical dermatology<br>Alexander Zink |
| 16:00 - 16:30 | Coffee Break |
| 16:30 - 17:30 | The main clinical databases and their validation process<br>Alexander Zink |
| 17:30 - 18:30 | Omics data and the main analyses tools<br>Andrea Tangherloni |

## Thursday, 18 June 2026

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| 08:30 - 09:30 | The Single-cell revolution and public available data<br>Andrea Tangherloni |
| 09:30 - 10:30 | Transcriptomics analysis in cutaneous biology<br>Eniko Sonkoly |
| 10:30 - 11:00 | Coffee break |
| 11:00 - 12:00 | miRNAs in dermatology and their analysis<br>Eniko Sonkoly |
| 12:00 - 13:00 | Modelling the skin barrier dysfunction<br>Sandrine Dubrac |
| 13:00 - 14:00 | Lunch break |
| 14:00 - 15:00 | Significance of metabolomics in skin research<br>Giovanni Damiani |
| 15:00 - 16:00 | Hands-on bulk data<br>Andrea Tangherloni |
| 16:00 - 16:30 | Coffee break |
| 16:30 - 17:30 | Hands-on in single-cell data: different perspectives<br>Andrea Tangherloni (bioinformatic person), Prof Eniko Sonkoly (physician-scientist) |
| 17:30 - 18:30 | Perspectives of spatial biology in dermatology<br>Giovanni Damiani |

20:00 - 23:00    Networking event with faculty members and participants

## Friday, 19 June 2026

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| 8:30 - 10:30 | Discussion panel addressing attendees' research problems<br>All speakers |
| 10:30 - 11:00 | Coffee break |
| 11:00 - 12:00 | Netskinmodels: A European Network for Skin Engineering and Modeling<br>Sandrine Dubrac |
| 12:00 - 13:00 | Conclusions<br>Giovanni Damiani |

*The programme might be subject to changes.*