

## General Info

<b>Organized by:</b> University of Salerno
<b>Name of the Advanced School</b> Mass spectrometry-based multi-omics principles and applications in life science
<b>Objective and learning goals</b> Mass spectrometry is now one of the key techniques to investigate changes in key molecular actors in biological systems. The goal of the school is to offer a comprehensive overview of the theoretical foundations of mass spectrometry as it applies to multi-omics fields such as metabolomics, lipidomics, and proteomics, utilizing state-of-the-art MS techniques. The curriculum will cover both basic and advanced analytical methods for identifying metabolites, lipids, and proteins in various biospecimens, including clinical and pharmaceutical samples. Additionally, the program includes a hands-on course featuring cutting-edge MS analyzers, such as orbitraps and quadrupole time-of-flight instruments, as well as separation techniques like ion mobility. By the end of the course, students will have acquired new skills in sample preparation, analysis strategies, and data processing techniques, along with the confidence to troubleshoot and set up MS platforms for real-world applications.
<b>Subject/scientific programme</b> The program will include theory and hands-on arguments relating to the following topics: <ul style="list-style-type: none"> <li>• Fundamentals of high-resolution mass spectrometry with Orbitrap, TOF and QTOF analyzers</li> <li>• Acquisition principles (DDA, DIA, PRM, DDA-PASEF, DIA-PASEF)</li> <li>• Separation methods (RP, HILIC, nanoLC, UHPLC)</li> <li>• Quantification methods (Label-free quantification, Tandem mass tags, external and internal standard)</li> <li>• Principles of MALDI-Imaging</li> <li>• MALDI matrix deposition methods, and image processing techniques</li> <li>• Training by experts on Thermo Orbitrap Lumos and Exploris 120, Bruker TimsTof Flex, TimsTof Pro, Rapiflex, and Solarix</li> <li>• Instrument preparation, cleaning operations, and calibration</li> <li>• Practical demonstration of data acquisition with real sample and standard injection</li> <li>• Identification &amp; Quantification of proteins and metabolites and lipids</li> <li>• Data Processing using Proteome Discoverer, Compound Discoverer, Metaboscape e SciLS software</li> <li>• Problem-solving on clinical, pharmaceutical, biological applications (and Troubleshooting)</li> </ul>
<b>Methods of carrying out the lessons</b> Frontal lessons and lab sessions. The school's lessons will be held in English.
<b>Teachers</b> To be defined (names will be communicated).
<b>Duration</b> The school will last two weeks. Each session will include approximately 30 hours of theoretical lessons alternating with practical sessions/hands-on carried out in the laboratories.
<b>Dates</b> October 2024 (exact dates will be communicated).
<b>Lesson times</b>

Each class day will include approximately 6 hours of lessons, three in the morning (from 10am to 1pm) and three in the afternoon (from 3pm to 6pm).

#### **Location**

Department of Pharmacy, University of Salerno (theory); Laboratory bio open lab Campus Baronissi (Lab).

#### **Admission requirements**

Eligible participants should possess:

- a degree in Pharmacy, Pharmaceutical Chemistry and Technology, Biology or Biotechnology, or Chemistry.
- knowledge of the English language;
- enjoyment of civil and political rights in the State of belonging or origin.

The school is also open to PhDs as well as research fellows born after 1989.

#### **Recruitment of participants**

The school will involve ten participants (8 belonging to partner Unisa-DIFARMA) and 2 from other PRP@CERIC partners.

#### **Documentation to be submitted**

The application must include:

- CV and ID document
- Brief summary (1 A4 page font size 11, maximum 4000 characters including spaces) of the research project the candidate is working on (e.g., PhD thesis)
- Recommendation letter

#### **Evaluation of participants**

The evaluation of the applications is carried out by an Evaluation Commission made up of three members, experts in the subjects covered by the school and belonging to the PRP@CERIC.

The Commission will evaluate the documentation submitted by each candidate, assigning the relevant scores. At the end of the evaluation, the Commission will form the ranking according to the decreasing order of the scores obtained by the candidates.

#### **Certificate of attendance**

At the end of the school, participants will receive a certificate of participation, subject to attendance of at least 80% of the theoretical/practical lessons.

#### **Other information**

For further information on participation in the school, please refer to the call for applications as soon as published.

#### **Contact person**

For any questions about the school, please refer to Prof. Pietro Campiglia, [pcampiglia@unisa.it](mailto:pcampiglia@unisa.it) or Prof. Eduardo Maria Sommella [esommella@unisa.it](mailto:esommella@unisa.it)