

**Master 2 internship project
Year 2024-2025**

Laboratory/Institute: Institute of Structural Biology (IBS) **Director:** Winfried Weissenhorn
Team: Mass spectrometry laboratory **Head of the team:** Elisabetta Boeri Erba

Name and status of the scientist in charge of the project: Elisabetta Boeri Erba
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HDR: yes ☒ ☐

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Program of the Master's degree in Biology:

☐ Structural Biology of Pathogens

Title of the project:

Study of DNA-based architectures using mass spectrometry

Objectives (up to 3 lines):

This project aims to use different mass spectrometers for investigating DNA nanostructures.

Abstract (up to 10 lines):

MS can assess the mass of biomolecules with high accuracy, sensitivity and rapidity. The MS lab has 3 different mass spectrometers, which allow us to assess the mass of DNA-based architectures. Using them, the student will characterize oligomeric states of DNA nanostructures. Indeed, she/he will investigate how experimental conditions (such as ionic strength of buffers) can tune assembly and disassembly of DNA-architectures.

Methods (up to 3 lines):

The student will analyse DNA in different conditions. She/he will use MALDI-TOF/TOF, and ESI-Q-TOF instruments. She/he will assess performances of the different instruments in terms of sensitivity and resolution.

Up to 3 relevant publications of the team:

Boeri Erba E, Pastore A. The Complementarity of Nuclear Magnetic Resonance and Native Mass Spectrometry in Probing Protein-Protein Interactions. Adv Exp Med Biol 2024; 3234:109-123. doi: 10.1007/978-3-031-52193-5_8

Boeri Erba E, Signor L, Petosa C. Exploring the structure and dynamics of macromolecular complexes by native mass spectrometry. J Proteomics 2020; 222:103799. doi: 10.1016/j.jprot.2020.103799

Puglisi R, Boeri Erba E, Pastore A. A Guide to Native Mass Spectrometry to determine complex interactomes of molecular machines. FEBS J 2020; 287(12):2428-2439. doi: 10.1111/febs.15281

Requested domains of expertise (up to 5 keywords):

Structural biology and biochemistry