DC 6 | Structures, mechanisms, and substrate selectivities of flavin-dependent halogenases

ORGANISATION

Founded more than 650 years ago, the **University of Pavia** is one of the oldest European universities. The structural biology group headed by Dr. Andrea Mattevi in the Dept. of Biology and Biotechnology investigates the structural basis of enzyme catalysis and the dynamic properties of proteins The core of the research activity is represented by X-ray crystallography and cryo-electron microscopy that is employed to study protein three-dimensional structures. This is complemented by other approaches such as site-directed mutagenesis, analysis of enzyme kinetics, computational chemistry, and biophysical methods. The available equipment includes several fermenters for cell growth, dedicated rooms for large scale mammalian cell culture, greenhouse, cell disruptors, five AKTA systems for protein purification, spectrophotometers and fluorimeters for enzymatic assays, Shimadzu HPLC with a fluorescence detector for pre-purification stability screening of proteins, plate reader for medium-throughput assays, multi-angle light scattering detector for the analysis of protein homogeneity, a system for the label-free evaluation of protein thermal stability, an instrument for microscale thermophoresis to probe protein binding, a 200 kV electron microscope. Furthermore, the Dept. of Biology and Biotechnology and the University of Pavia (Centre of Large Equipment; CGS) host state-of-the-art facilities including those relevant for HaloVerse: mass spectrometry, protein biochemistry and biophysics (ultracentrifugation, thermophoresis, fluorimetry, light scattering), mammalian cell culture, bacterial and plant protein expression.

ROLES AND RESPONSIBILITIES

The main part of your PhD research (4 years in total) will be carried out at **the University of Pavia** (UniPV, Italy) under the supervision of **Prof. Andrea Mattevi** in the Department of Biology and Biotechnology. Within these four years, an academic research stay (of 12 months) will take place at the **University of Girona** (UdG, spain) under the supervision of **Prof. Silvia Osuna**. Additionally, an industrial secondment at the company **Zymvol** (I) is foreseen. The Horizon Europe Marie Skłodowska-Curie Actions (MSCA) – Doctoral Network (DN) project starts in January 2026. The date of recruitment and start of the PhD project is planned for April 2026 and latest in December 2026. Your **PhD degree** (so-called double degree) will be awarded based on successful completion of the research work from **two universities (UniPV, Italy and University of Girona, Spain)**. You will also be required to participate in the training events and workshops organized by the DN- Joint Doctorates (JD) program. As a MSCA fellow, you are also expected to **contribute your time in the dissemination of your PhD project's result** through public engagement and other scientific platforms.

The PhD research will focus on:

We invite applications for an exciting PhD research project at the interface of bioinformatics, biocatalysis, and chemistry. The successful candidate will combine computational and experimental approaches to discover, characterize, and engineer novel enzymes with unique catalytic properties. The project will involve:

i) Structural and mechanistic studies through crystal structure determination of halogenases acting on aromatic and alkyne substrates, including enzymes discovered from extreme environments.
ii) Elucidation of reaction mechanisms using experiments and simulations.
iii) Identification of key amino acid residues involved in catalytic mechanisms and substrate specificity, guiding structure-based enzyme engineering.
iv) Structural and biochemical analysis of engineered enzyme variants.
v) Bioinformatics-driven enzyme discovery: Application of structural bioinformatics to identify other enzyme families with potential for promiscuous halogenation.
vi) Mechanistic insights: Investigation of substrate-dependent features governing efficiency and selectivity of halogenation reactions.

Primary supervisor: Prof. Andrea Mattevi
Secondary supervisor: Prof. Silvia Osuna
Recruiting institution: University of Pavia (Pavia, Italy)
Double degree awarding institution: University of Girona (Girona, Spain)

QUALIFICATIONS

- An outstanding M.Sc. degree in Chemistry, Biological chemistry, Biochemistry, or related field

- Eligible as a graduate student at the University of Pavia (Italy) and the University of Girona (Spain),
- Research experience in enzyme purification and assays, experience in molecular and structural biology is a plus
- Ability to work in an international team,
- Inter- and multidisciplinary thinking,
- High motivation,
- An integrative and cooperative personality,
- Fluency in English – written and oral.

CONDITIONS OF EMPLOYMENT

We offer you in accordance with the Italian and European Law

- a salary of € 54.378,36 gross per year.
- a temporary position of four years. Prolongation of the contract is contingent on sufficient progress in the first year to indicate that a successful completion of the PhD thesis within the next three years is to be expected. A PhD training programme is part of the agreement and the successful candidate will be enrolled in the Graduate School of Chemistry.

The 1.0 FTE appointment is temporary for a specified period of four years. The preferred starting date is between April 1st and July 1st 2026.

APPLICATION PROCEDURE

To apply for the position, kindly provide:

(i) A letter of motivation including a statement of your research interests, relevant skills and experience and an explanation for the choice of position(s);
(ii) A CV including publication list (if applicable);
(iii) Names and contact details of up to three referees willing to write confidential letters of recommendation;
(iv) Copies of relevant diplomas including explanation of international grades.

Please upload applications only according to instructions at www.haloverse.eu/recruitment.

Address applications to: Prof. Andrea Mattevi

The University of Pavia strives to be a university in which students and staff are respected and feel at home, regardless of differences in background, experiences, perspectives, and identities. We believe that working on our core values of inclusion and equality are a joint responsibility and we are constructively working on creating a socially safe environment. Diversity among students and staff members enriches academic debate and contributes to the quality of our teaching and research. We therefore invite applicants from underrepresented groups in particular to apply. For more information, see also our diversity policy webpage https://en.unipv.it/en/university/inclusion-and-sustainability. Our selection procedure follows the guidelines of the European Commission's European Code of Conduct for recruitment of researchers.

Unsolicited marketing is not appreciated.

APPLICATION DEADLINE

You may apply until 31st of December 2025 11:59pm / before 1st of January 2026 Central European Time (CET) for this position by means of the online application form (click on "Apply" below on the advertisement on the HaloVerse website).

MARIE SKŁODOWSKA-CURIE ACTIONS
Doctoral Networks (DN)

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