DC 12 | Intensified biocatalytic processes for the preparation of halogenated tryptamine derivatives *via* flow biocatalysis

ORGANISATION

The **University of Milan** (UMIL) is a leading public university renowned for its excellence in higher education and research. Founded in 1924, UMIL is committed to advancing knowledge, innovation, and societal progress through world-class teaching and cutting-edge research. With more than 65,000 students, 900 doctoral candidates, and 2,400 academic staff, it is one of the largest and most dynamic universities in Europe. UMIL is the only Italian member of the League of European Research Universities (LERU), an exclusive network of 23 top research-intensive institutions in Europe. It also plays an active role in the 4EU+ Alliance, a strategic partnership of six leading multidisciplinary universities dedicated to building a truly integrated European higher education and research landscape. The position we offer will be embedded within the Department of Food, Environmental and Nutritional Sciences (DeFENS), Section of Chemistry and Biomolecular Sciences (https://www.unimi.it/en/university/offices-and-facilities/departments). DeFENS is a multidisciplinary department dedicated to developing innovative foods, (bio)active ingredients, and environmentally sustainable processes, taking a holistic approach to advance solutions that safeguard and enhance human health and quality of life. In particular, the Section of Chemistry and Biomolecular Sciences integrates knowledge and methodologies to tackle current issues at the molecular level across chemistry, biochemistry, biology, food&agriculture, pharmaceuticals, agrochemicals, and environmental sciences. Prof. Dr. Contente research group offers an inclusive and interdisciplinary environment, combining biocatalysis, reactor technology, synthetic and process chemistry. The team fosters strong national and international collaborations across academia and industry, targeting industrially relevant applications. Research focuses on discovering novel biocatalysts, enhancing their stability through protein immobilization, and applying them in scalable processes using advanced reactor technologies (*e.g.,* flow chemistry and rotating bed reactors). The ultimate goal is the sustainable and intensified production of high-value bioactive compounds.

ROLES AND RESPONSIBILITIES

The main part of your four-year PhD will be conducted at the **University of Milan** (UMIL, Italy) under the supervision of **Prof. Dr. Martina Letizia Contente** within the Department of Food, Environmental and Nutritional Sciences (DeFENS), Section of Chemistry and Biomolecular Sciences. During your PhD, you will also undertake a 12-month academic research stay at the **University of Girona** (UdG, Spain) under the guidance of **Prof. Dr. Sílvia Osuna**, as well as an industrial secondment at **BAYER AG** (Germany). This Horizon Europe Marie Skłodowska-Curie Actions (MSCA) – Doctoral Network (DN) project begins in January 2026, with the PhD recruitment and start planned for April 2026 (latest by December 2026). Upon successful completion of your research at both universities, you will be awarded a double PhD degree from **UMIL** and **UdG**. As part of the program, you will participate in training events and workshops organized by the DN – Joint Doctorates (JD) program and are expected to actively contribute to the dissemination of your research through public engagement and scientific platforms.

The PhD research will focus on:

(i) Interdisciplinary project on biocatalysis, chemistry, and process design
(ii) Identification of novel halogenases
(iii) Computationally guided rational modifications to enhance enzymatic performance (in collaboration with UdG).
(iv) Cloning, expression, purification, and characterization of selected enzymatic candidates
(v) Development of immobilized enzyme systems to enhance stability and reusability, supported by structural and morphological characterization using advanced microscopy
(vi) Development of flow-based processes for the synthesis of halogenated building blocks and complex cascade reactions to produce bioactive compounds at gram scale (in collaboration with Bayer)
(vii) Downstream processing for process automation

Primary supervisor: Prof. Dr. Martina Letizia Contente (martina.contente@unimi.it)
Secondary supervisor: Prof. Dr. Silvia Osuna (silvia.osuna@udg.edu)
Recruiting institution: University of Milan (Milan, Italy)
Double degree awarding institution: University of Girona (Girona, Spain)

QUALIFICATIONS

- An outstanding M.Sc. degree in Chemistry, Biological chemistry, Biochemistry, Biotechnology, or related field
- Eligible as a graduate student at the University of Milan (Italy) and the University of Girona (Spain)
- Research experience in organic chemistry, analytical methods (HPLC, GC, MS, NMR etc.), expertise in basic molecular biology and enzymology (cloning, enzyme purification and characterization). Protein immobilization and process chemistry is a plus
- High motivation and passion for innovative scientific research
- Ability to work in team
- Inter- and multidisciplinary thinking
- Excellent communication and social skills
- Fluency in English – written and oral.

CONDITIONS OF EMPLOYMENT

We offer you:

- a four-year PhD position**.** The candidate research progress will be assessed annually to confirm advancement to the next year and eligibility for the final thesis submission and defense
- a salary of € 3,473 gross per month (mobility allowance included).

The conditions of employment: **https://www.unimi.it/en/study/postgraduate-study/doctoral-research-phd-programmes**

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.

Address applications to: Prof. Dr. Martina Letizia Contente

The **University of Milan** is committed to fostering an inclusive and respectful academic environment where all students and staff feel valued and supported, regardless of their background, experiences, perspectives, or identities. We believe that promoting equality, diversity, and inclusion is a shared responsibility and a key element in ensuring a socially safe and stimulating workplace. Diversity among our academic community enriches dialogue, strengthens collaboration, and enhances the quality of teaching and research. We therefore particularly encourage applications from individuals belonging to underrepresented groups. For more information, please consult our **Diversity and Equal Opportunities Policy**: https://www.unimi.it/en/university/la-statale/universitys-commitment-equal-rights. Our selection procedure follows the guidelines of the Recruitment code https://www.unimi.it/en/university/work-us and European Commission's European Code of Conduct for recruitment of researchers, https://euraxess.ec.europa.eu/jobs/charter/code

Unsolicited marketing is not appreciated.

APPLICATION DEADLINE

You may apply until **31 December 2025, 11:59 p.m. CET (Central European Time)** for this position *via* the online application form (click “Apply” below on the advertisement on the HaloVerse website).

MARIE SKŁODOWSKA-CURIE ACTIONS
Doctoral Networks (DN)

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