
PhD opportunity - Architecture, Dynamics and Regulation of the Bacterial LPS HoloTranslocon

This PhD opportunity is offered through the [BEST Doctoral Programme](#), led by the **University of Toulouse** and co-funded by the **European Union** through **Horizon Europe – Marie Skłodowska-Curie Actions (MSCA COFUND)** and the **Toulouse Initiative for Research's Impact on Society (TIRIS)**. Thanks to this programme, **19 doctoral candidates** will be recruited through an international co-supervision scheme across three major TIRIS thematic pillars : Health & Well-being, Global Changes and Sustainable Transitions. The entire recruitment process will take place between November 2026 and April 2027 and will be managed by the **University of Toulouse (UT)**.

Host Institution	Center for Integrative Biology (CBI), Centre National de la Recherche Scientifique, University of Toulouse, France
Supervisor	Raffaele Ieva, Regulation and Transport of Protein across Cell Membranes team
Co-supervising institution	Warwick University, United Kingdom
Co-supervisor	Phillip Stansfeld
Contract duration: 36-month Starting date: September/October 2027	

Please contact us at isabelle.saves@utoulouse.fr for any questions regarding CBI and/or the recruitment process.

Research topic

The outer membrane (OM) of Gram-negative bacteria, including clinically important Enterobacteriaceae, forms a critical permeability barrier protecting pathogens from antibiotics and detergents. This asymmetric lipid bilayer contains lipopolysaccharide (LPS) in its outer leaflet, a key determinant of barrier function. LPS transport and assembly into the OM rely on the essential trans-envelope LPS transport pathway (Lpt). Beyond serving as a substrate, LPS is increasingly recognized as an important structural and regulatory component that determines Lpt stability and activity, though the underlying mechanisms remain largely unclear. Building on recent joint discoveries by the IEVA (Toulouse, France) and STANSFELD (Warwick, UK) teams, this international PhD project will investigate LptM and LptY, two newly identified components of the OM LPS holotranslocon LptDEMY. By docking on LptD near predicted LPS binding sites, LptM assembles into the translocon promoting its biogenesis and activity. Instead, LptY contributes to stabilize the OM holotranslocon in the Lpt trans-envelope bridge. Together our data lead to the hypothesis that LptM and LptY may provide a molecular link between LPS recognition, transport and translocon regulation. The selected PhD candidate will receive

interdisciplinary training at the interface of microbiology, protein biochemistry and computational structural biology. In vivo site-directed crosslinking, affinity purification and biochemical assays will be integrated iteratively with structural prediction and molecular dynamics simulations to define the architecture and dynamics of LptDEMY in active and idle states. Key protein protein and protein–LPS interfaces will then be validated through targeted mutagenesis, LPS binding and transport assays, and OM integrity measurements. The integrated computational and biochemical experimental strategy will establish a comprehensive mechanistic model of LPS holotranslocon regulation, providing fundamental insights into OM biogenesis and potentially highlighting novel targets for antimicrobial design

Keywords:

Antimicrobial resistance, Bacterial outer membrane, Lipid transport, Protein assembly, LptDE, LptM

International Co-supervision

The project will be internationally co-supervised by Raffaele Ieva from [Regulation and Transport of Protein across Cell Membranes team](#) at **CBI Toulouse, France** (Centre National de la Recherche Scientifique, [University of Toulouse](#)) and Phillip Stansfeld at Warwick University, United Kingdom. The doctoral researcher will undertake research periods at Warwick University, with the duration and organisation defined according to the scientific needs.

Experience/Skills required :

- Hold, by 23 November 2026, a Master's degree or an equivalent qualification granting access to doctoral studies in France and not hold a doctoral degree.
- Have not resided in France or carried out your main activity in France for more than 12 months during the 36 months immediately preceding 23 November 2026. Periods of stay as a tourist, refugee, or time spent in national service, are not considered as residency.
- Have a B2 level of English
- Previous experience in computational biology, microbiology, molecular biology, or protein biochemistry will be considered an advantage.

Application Process

Call for application - 23 November 2026

Applications must be submitted online through the application platform : edd-projets.utoulouse.fr

Please contact us at isabelle.saves@utoulouse before applying, or if you have any questions regarding CBI or the recruitment process. Please use the following email subject line: BEST call – [Supervisor name].

Eligibility check - 24 to 30 November 2026

Written evaluation - 4 December to 15 January 2027

Consolidation of pre-selected projects - 19 January to 19 March 2027

Oral evaluation - 29 March to 4 April 2027

Result - April 2027

Starting date: September/October 2027 (Contract duration: 36 months)

For additional information: <https://doctorat.univ-toulouse.fr/cofund-best>



About the CBI

Located in Toulouse, in the sunny southwestern of France, the [Center for Integrative Biology \(CBI\)](#) is a **fundamental biology research institute** affiliated with the [National Center for Scientific Research \(CNRS\)](#) - the largest public research organization in France - and the University of Toulouse. The institute brings together **47 research groups**.

The CBI aims to understand the mechanisms, dynamics and behaviors of living organisms, to advance knowledge on the current societal challenges. Research at the CBI use multidisciplinary and multi-scale approaches, from isolated molecules to whole organisms and animal societies, applied to numerous model organisms, from bacteria to man.

CBI offers an **international and interdisciplinary research environment**, with access to advanced facilities and opportunities for scientific and career development. The institute benefits from **a collaborative and international scientific culture**, and is committed to promoting equality, diversity and inclusivity.