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, Membrane Biogenesis and Protein Transport
Co-supervising institution	Warwick University, United Kingdom
Co-supervisor	Phillip Stansfeld
Contract duration: 36-month	**Starting date:** September/October 2027

Please contact us (isabelle.saves@utoulouse.fr; raffaele.ieva@utoulouse.fr) for any questions regarding CBI and/or the recruitment process.

Research topic

The outer membrane (OM) forming the outermost layer of the envelope of Gram-negative bacteria functions as a critical permeability barrier that protects clinically important pathogens from antibiotics and detergents. Lipopolysaccharide (LPS), a complex glycolipid that constitutes the outer leaflet of the OM, is a key determinant of this barrier function. Its transport and assembly rely on the essential trans-envelope LPS transport apparatus (Lpt). Beyond serving as a substrate, LPS is increasingly recognized as an important structural and regulatory component that influences Lpt stability and activity, although the underlying mechanisms remain largely unclear.

Building on two recent collaborative studies by our teams (R. IEVA - Toulouse, France and P. STANSFELD - Warwick, UK), this international PhD project will investigate the LPS holotranslocon LptDEMY in the OM of *Enterobacteriaceae*, focusing on the regulatory roles of the newly identified components LptM and LptY. We have shown that LptM mimics LPS, thereby promoting LPS holotranslocon biogenesis and activity, whereas LptY helps stabilize the LPS receptor domain of the holotranslocon. These findings suggest that LptM and LptY

help coordinate LPS recognition with the functional state of the translocon. The central objective of this project is to elucidate the molecular mechanisms coupling LPS recognition to the regulation of its transport.

The selected PhD candidate will receive interdisciplinary training at the interface of microbial genetics, protein biochemistry, and computational structural biology. Combining experimental and computational approaches, the student will investigate how LptM and LptY influence i) the accessibility of LPS binding sites in the holotranslocon; ii) the dynamics of LPS transfer and its assembly in the outer leaflet of the OM. This work will advance our understanding of OM biogenesis and potentially identify new target sites for antimicrobial development.

Keywords:
Antimicrobial resistance, Bacterial outer membrane, Lipid transport, Lipopolysaccharide, Protein assembly, LptDE, LptM, LptY

International Co-supervision

The project will be internationally co-supervised by Raffaele Ieva from the Membrane Biogenesis and Protein Transport 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 be initially based at CBI Toulouse and 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 – [IEVA Raffaele].

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.