



PhD opportunity - Mechanics of tumor cell trogocytosis by macrophages

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	Institute of Pharmacology and Structural Biology, Centre National de la Recherche Scientifique, University of Toulouse, France
Supervisor	Renaud Poincloux - Phagocyte Architecture and Dynamics team
Co-supervising institution	University of Toronto, Canada
Co-supervisor	Spencer Freeman
Contract duration: 36-month Starting date: September/October 2027	

Please contact us at international@ipbs.fr for any questions regarding IPBS and/or the recruitment process.

Research topic

Macrophages are professional phagocytes of the immune system. One of their key functions, both for tissue homeostasis and the destruction of pathogens, is to ingest and digest particles. This process, known as phagocytosis, involves a dynamic reorganisation of the actin cytoskeleton and the generation of mechanical forces. When particles are too large to be ingested, macrophages can also extract small portions of the target particle one by one, a phenomenon known as trogocytosis. Trogocytosis plays a variety of crucial roles, ranging from the regulation of the haematopoietic niche to the modulation of immune responses. In the context of cancer, this process is notably used by macrophages to ingest opsonised tumour cells piece by piece. During phagocytosis, the macrophage exerts mechanical forces on its target, generated by actin polymerisation and myosin contractility. Whilst the role of cytoskeletal motors in phagocytosis is well characterised, the molecular mechanisms and forces involved in trogocytosis remain, despite the importance of this function, largely unexplored, and we hypothesise that mechanical forces are crucial for efficient trogocytosis. The aim of this project is therefore to characterise the structure and function of the cytoskeleton and the mechanical forces involved in the process of trogocytosis carried out by macrophages. To this end, experimental models of trogocytosis involving tumour cells and human and murine macrophages will be established, and trogocytosis



will be quantified using fixed samples via real-time microscopy techniques. A specific labelling strategy will be developed to distinguish trogocytosis events from those of phagocytosis. Once these approaches have been optimised, pharmacological inhibitors and CRISPR-Cas9-mediated gene depletion approaches targeting the macrophage cytoskeleton will be used to assess the impact of its inhibition on the efficiency and dynamics of the trogocytosis process, thereby beginning to better understand the functioning of this key yet poorly characterised process

Keywords: Macrophages, Cancer cells, Trogocytosis, Cytoskeleton, Imaging, Mechanobiology

International Co-supervision

The PhD will be jointly supervised by Dr Renaud Poincloux from the [Phagocyte Architecture and Dynamics team](#) at IPBS (Toulouse, France) and Dr Spencer Freeman team at the University of Toronto, Canada. The doctoral researcher will undertake research periods at the University of Toronto, 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
- We are looking for a curious and highly motivated cell biologist with a strong background in cell biology and an interest in working at the interface of cell biology, mechanobiology, and immunology.
- Experience in microscopy, particularly fluorescence microscopy and/or live cell imaging, would be appreciated, as well as a strong interest in cytoskeletal dynamics.
- We are looking for someone who is enthusiastic about interdisciplinary research, willing to explore new approaches, and eager to interact with researchers from complementary fields.
- Have the ability to work independently, combined with a critical mindset and strong scientific curiosity, will be essential to successfully contribute to this international and interdisciplinary project.

Application Process

Call for application - 23 November 2026

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

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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>



Contact : best-helpdesk@utoulouse.fr

About the IPBS

Located in Toulouse, in the sunny southwestern of France, [IPBS](#) is a leading 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 **19 research groups**.

IPBS conducts state-of the-art research in *cancer biology, immunology, microbiology, structural biology and biophysics*. It is a world leader in the discovery, characterization, validation and exploitation of novel pathways and pharmacological targets in the fields of cancer, infection, and inflammation. The institute combines molecular and cellular biology approaches and in vivo experiments.

IPBS 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.