



## FUNDED PhD Position (3 years, starting 09/2025)

### Microtubule organization and nuclear positioning

*Host laboratory: Institut Jacques-Monod, Paris, Team Polarity and Morphogenesis.*

As part of an ANR project, funding for a PhD position (3 years) is available in **Antoine Guichet's** laboratory at the Jacques Monod Institute in Paris to study **microtubule organization and nuclear positioning using *Drosophila*** (<https://www.ijm.fr/research-topics/guichet-lab-va/?lang=en>).

Microtubules (MTs) are a core component of the cytoskeleton and play a key role in intracellular transport. As such, they play an important role in the positioning of the nucleus. Nuclei are often positioned asymmetrically, and the significance of this is emphasised by its association with brain and muscle pathologies when misplaced. Our team is studying, in a developmental context, how multiple MT networks cooperate to position the nucleus within large cells. To this end, we are using the *Drosophila* oocyte, a large polarised cell in which nuclear positioning and MT organisation can be monitored in 3D using high-resolution microscopy.

The aim of this thesis project is to functionally characterise the MT networks that anchor the nucleus. The nucleus is wrapped in a cage of microtubules that presumably anchors it to the cell cortex; however, the general architecture and regulation of this network remain poorly characterised.

The second part of the PhD project involves investigating the relationship between the overall organisation of the MT in the oocyte and the polarizing transport. The functional specialization of MTs comes partially from post-translational modifications (PTMs) of tubulins that modulate MT organization and function. Among these PTMs, detyrosination of  $\alpha$ -tubulin which consists in the removal of the terminal tyrosine of  $\alpha$ -tubulin, is especially important for MT-associated transport, as this modification affects the dynamic of MTs and their interaction MT-associated motors. This part of the project is being carried out in collaboration with François Juge from the **Tubulin Code** team in the Institute of Human Genetics (Montpellier). Our aim is to decipher, in a developmental context, the implications of the  $\alpha$ -tubulin detyrosination on distinct aspects of polarized transport.

We are looking for a highly motivated candidate with a solid background in cellular biology and genetics. Experience with the *Drosophila* model is a plus. Main techniques involved for the project are: cellular and molecular biology, high-resolution imaging and *Drosophila* genetics.

To apply : please contact [antoine.guichet@ijm.fr](mailto:antoine.guichet@ijm.fr) providing CV, a short letter of motivation and contact details for two references.

The project builds on the following achievements of the team :

Lepesant, J.-A., Roland-Gosselin, F., Guillemet, C., Bernard, F., & **Guichet, A.** **Cells** (2024). (PMID: 38275826)

Loh, M., K., Bernard, F., **Guichet, A.** **Development** (2023). (PMID: 37334771)

Jouette J, Claret S, **Guichet.** **eLIFE** (2019). (PMID: 30672465)

Tissot N, Lepesant JA, Bernard F, , ..., **Guichet A.** **Nature Communication** (2017). (PMID: 28447612)