



Post-doc fellowship in Edouard Bertrand lab at IGMM

Project : Systematic analysis of gene expression in single intact cells by high throughput detection of single mRNAs

Characterizing gene expression at the level of single cells and in the context of the cellular space is a difficult challenge, but meeting it will certainly drive important conceptual breakthroughs. Single molecule FISH (smFISH) identifies and localizes all mRNA molecules produced by a given gene, in every cell of large populations. SmFISH thus possesses unique advantages to study mRNA localization at the sub-cellular level. This is a fundamental but understudied phenomenon, involved in many biological processes, including mitosis, cell polarity, co-translational assembly of protein complexes etc...

In this project, we aim at mixing traditional and innovative approaches to combine the power of traditional smFISH techniques with the systematic aspects of genome-wide approaches. We will collect high-resolution, high quality images of the localization of many mRNAs in native fixed cells. Our first goal will be to discriminate localized mRNA from randomly distributed ones. Our second goal will be to group localized mRNAs into functional categories, to understand the functions of this process at the cellular level. This project will be performed in collaboration with the image analysis group of C. Zimmer (Pasteur Institute).

Requirements : PhD in molecular or cellular biology or closely related discipline. Competence and/or familiarity in molecular biology techniques, cell biology, microscopy. Capability of working in a team, and independently.

Additional qualifications : Experience with image analysis and high-throughput approaches.

Where : Edouard Bertrand lab (<http://www.igmm.cnrs.fr/spip.php?rubrique150>) at the Institut de Génétique Moléculaire de Montpellier (<http://www.igmm.cnrs.fr/>), Montpellier, France.

When : 2-year fellowship starting in the early 2017.

Funding : salary - gross 2550 €/month is provided by EpiGenMed (<https://www.epigenmed.fr/>).

Application : Please provide 1) a letter that explains the reasons for being interested in this job, 2) a CV with list of publications, 3) contact details for 3 previous mentors, or someone who closely followed your research activities. Application should be sent to Edouard Bertrand (edouard.bertrand@igmm.cnrs.fr) and Marion Peter (marion.peter@igmm.cnrs.fr).

Recent publications :

- Tsanov, N. *et al.* smiFISH and FISH-quant - a flexible single RNA detection approach with super-resolution capability. *Nucleic Acids Res.* (2016). doi:10.1093/nar/gkw784
- Pichon, X. *et al.* Visualization of single endogenous polysomes reveals the dynamics of translation in live human cells. *J. Cell Biol.* 214, 769–781 (2016).
- Tantale, K. *et al.* A single-molecule view of transcription reveals convoys of RNA polymerases and multi-scale bursting. *Nat. Commun.* 7, 12248 (2016).
- Mueller, F. *et al.* FISH-quant: automatic counting of transcripts in 3D FISH images. *Nat. Methods* 10, 277–278 (2013).
- Hallais, M. *et al.* CBC-ARS2 stimulates 3'-end maturation of multiple RNA families and favors cap-proximal processing. *Nat. Struct. Mol. Biol.* 20, 1358–1366 (2013).
- Kallehauge, T. *et al.* Nuclear retention prevents premature cytoplasmic appearance of mRNA. *Mol. Cell* 48, 145-152 (2012).