Master Biologie Moléculaire et Cellulaire 'BMC',
Université Paris Cité - *UFR Sciences du Vivant*

Parcours : **Biologie et Développement Cellulaires 'BDC'**
https://master2bdc.ijm.fr/
Fiche de Projet de Stage de M2, 2026-2027

Unité INSERM ou CNRS ou Université : UMR7592, Institut Jacques Monod (CNRS/UPC) **Intitulé Equipe : Comparative Developmental Neurobiology** **ED d'appartenance : BioSPC** **Responsable de l'Equipe : Nikos KONSTANTINIDES**	**Responsable du Stage : Nikos KONSTANTINIDES** **Contacts** Adresse : 15 rue Helene Brion Email : nikos.konstantinides@ijm.fr Tel : +33-781186327

Titre du projet : Post-transcriptional regulation of neuronal identity

Résumé du Projet de Stage (en 300 mots maximum, mots clés en gras)
Across animal species, the immense variety of neural cell types stem not just from shared developmental schemes, but from intricate layers of gene expression control that operate with remarkable spatial and temporal accuracy. Although transcriptional regulation has traditionally been viewed as the primary force guiding neuronal development and circuit formation, it represents only the first layer of a far more intricate system. Processes that act after transcription - including RNA modification, alternative splicing, subcellular RNA distribution, stability control, translation dynamics, and protein turnover - are now emerging as critical players in shaping neuronal features and responsiveness, yet they have often been underappreciated in the broader narrative.
Objective: The M2 student will address the differences in the developing transcriptome and proteome of a well described neuronal type of the fly visual system.
To study the post-transcriptional regulation of neuronal identity, the student will perform mass spectrometry of isolated neurons of a specific neuronal type, called Mi1, of the *Drosophila* visual system at different developmental stages. In parallel, s/he will perform bulk RNA sequencing of the same neurons at the equivalent developmental stages. The student will then compare the RNA and protein dynamics over developmental time and will test hypotheses regarding the post-transcriptional regulation mechanisms using the powerful *Drosophila* genetic toolkit. Moreover, the student will familiarize themselves with the analysis of single-cell mRNA sequencing data for the same neuronal type that is already available in the lab. Finally, if there is time, the student will perform the same analysis in a different neuronal type to identify generalizable principles.

Publications de l'équipe relatives au projet de stage (max 5)
Özel M.N., Simon F., …, Konstantinides N.*, Desplan C.* (2021) Neuronal diversity and convergence in a visual system developmental atlas. Nature 589(7840):88-95

Simon F., Konstantinides N. (2021) Single-cell transcriptomics in the Drosophila visual system: advances and perspectives on cell identity regulation, connectivity, and neuronal diversity evolution. Developmental Biology 479:107-122

Konstantinides N.*, Holguera I., Rossi A.M., et al. (2021) A complete temporal transcription factor series in the fly visual system. Nature 604 (7905): 315-322

Filippopoulou K., Konstantinides N. (2023) Evolution of patterning. FEBS J. doi: 10.1111/febs.16995

Filippopoulou K., …, Konstantinides N. (2026) Evolutionary dynamics of temporal transcription factor series in the insect optic lobe. bioRxiv 2026.01.08.698497; doi: https://doi.org/10.64898/2026.01.08.698497