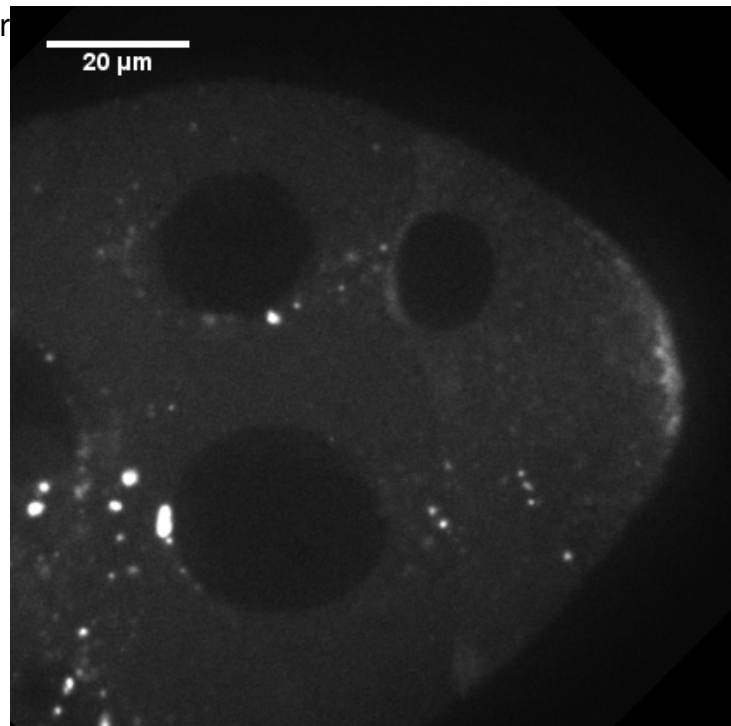


Biophotonics

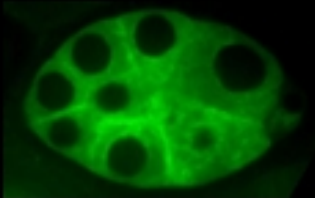
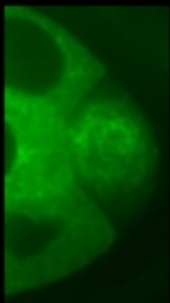
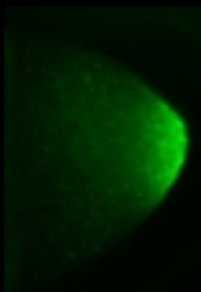
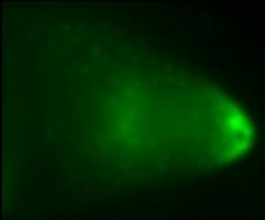
Correct spatial and temporal



al localization of mRNAs has broad biological importance, being essential in diverse processes such as growth and differentiation, asymmetric cell division, long-term memory formation, axon guidance and the establishment of the basic body axes. Efficient transport of mRNAs requires highly orchestrated events between nuclear and cytoplasmic proteins. Though genetic data has revealed key roles for many proteins during the transport process, for some the direct associations with the localized transcript have been impervious to biochemical studies.

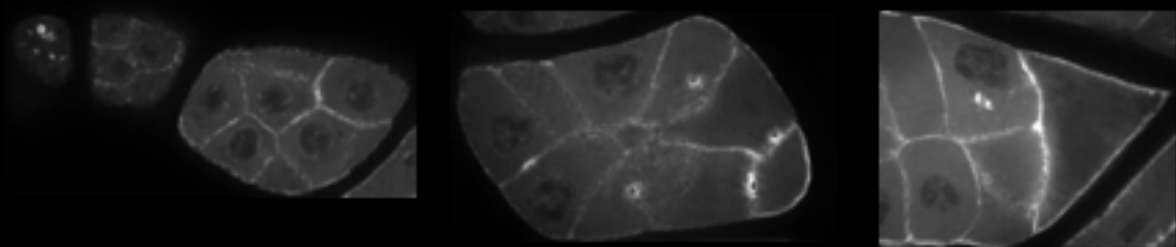
In the lab, we examine the spatio-temporal requirements of trans-acting factors during the mRNA transport process in *Drosophila melanogaster* oocytes. Specifically, we study the posterior pole determinant oskar mRNA as it interacts with Staufen and Armitage proteins during the dynamic and multi-step process of mRNA transport. [Staufen](#) is a double-stranded RNA-binding protein important for proper localization of oskar mRNA to the posterior during mid-oogenesis, and Armitage is an RNA silencing protein involved in oskar's translation repression during transport. Though implied, their mechanism of association with oskar mRNA remains unresolved, most likely due to the complexity of reconstructing all the molecular interaction via classical biochemical techniques. Several biological mechanisms act on oskar mRNA after transcription, including nuclear export, active cytoplasmic transport, translational repression, localization via anchoring, translational de-repression, and ultimately RNA decay. We believe that the RNA-protein complex can be resolved in vivo as it emerges through all these processes, via elegant fluorescent techniques used in concert with state of the art, single molecule tracking algorithms and live-cell imaging.

Live imaging of a targeted expression of the Khc-GFP using GAL4/UAS system in the developmental stages of *D.melanogaster* ovaries

Stages 5/6	Stages7/8	Stage 9	Stages 10 and up
			

Kinesin heavy chain-GFP-Green

GAL4/UAS expression of actin-GFP in different stages of fixed *D.melanogaster* ovaries



Actin filament-GFP-white