## Graduate School Event

# Thesis Defense: Keratins act as global coordinators of tissue spreading through mechanosensitive feedback


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Heisenberg Group

Host: Michael Sixt



For tissues to spread, they must be deformable while maintaining their structural integrity. How these opposing requirements are balanced within spreading tissues is not yet well understood. Here, we show that keratin intermediate filaments function in epithelial spreading by adapting tissue mechanical resilience to the stresses arising in the tissue during the spreading process. By analysing the expansion of the enveloping cell layer (EVL) over the large yolk cell in early zebrafish embryos in vivo, we found that keratin network maturation in EVL cells is promoted by stresses building up within the spreading tissue. Through genetic interference and tissue rheology experiments, complemented by a vertex model with mechanochemical feedback, we demonstrate that stress-induced keratin network maturation in the EVL increases tissue viscosity, which is essential for preventing tissue rupture. Interestingly, we also find that keratins are required in the yolk cell for mechanosensitive actomyosin network contraction and flow, the force-generating processes that orchestrate EVL pulling. Overall, this work illustrates that keratins exhibit dual mechanosensitive functions in development. Such duality in keratin functions enables a delicate balance between the production of pulling forces in the yolk cell and maintenance of the mechanical resilience of the EVL against stresses generated by these pulling forces, thereby ensuring uniform and robust tissue spreading.


## Monday, October 6, 2025 03:30pm - 04:30pm

Sunstone Bldg / Ground floor / Big Seminar Room B (I23.EG.102) and Zoom

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https://ista.ac.at/en/campus/how-to-get-here/ The ISTA Shuttle bus is marked ISTA Shuttle (#142) and has the Institute Logo printed on the side.