

# INVITATION

Colloquium  
Summer semester 2026

Mathieu Preußner

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will give a seminar on Tuesday, **May 12, 2026, at 12:00 p.m. in Hörsaal 2 (-1.203) of the Biologicum** on the Riedberg campus:

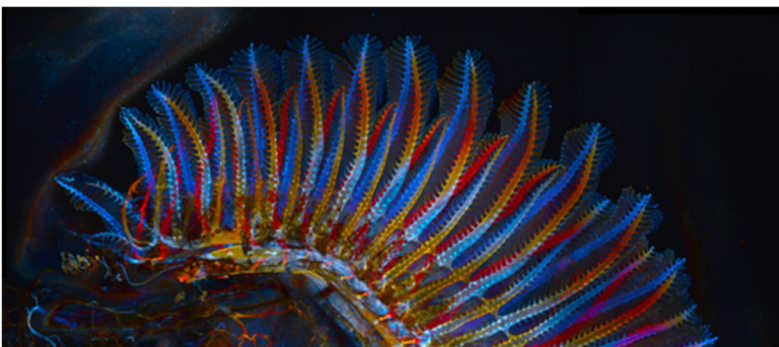
## “Forces that Shape Breathing: Mechanobiology of Zebrafish Gill Lamellae”

During organogenesis, cells undergo a series of coordinated changes that guide their progression from a fertilized egg to terminally differentiated states. Beyond biochemical signalling, physical forces play a fundamental role in shaping tissues. Cells not only respond to these forces but also actively generate and transmit them, enabling large-scale tissue remodelling.

This dynamic interplay between force generation and mechano-sensing forms the basis of cellular mechanobiology.

In this talk, I will present two studies from my PhD in the Lecaudey lab that establish the zebrafish gill as a powerful tractable in vivo model to study mechanobiology, branching morphogenesis and vascular development.

In the first part, published recently (Preußner et al., 2025), I will outline the vascular architecture and its developmental origins. We identified fundamental differences in filament formation along the dorso-ventral axis and showed that these early asymmetries correlate with, and likely underlie, the structural asymmetries observed in adult gills. This work provides a developmental blueprint for gill architecture and establishes the foundation for future studies.



In the second part, I will focus on the lamellae and their specialized, contractile, endothelial-like pillar cells. I will present unpublished results demonstrating that the actin-binding protein Shroom3 establishes a mechanical threshold required for lamellar stability.

Together, these results uncover a force-dependent mechanism that safeguards the structural integrity of the respiratory surface.

Host: Prof. Dr. Virginie Lecaudey