

## Basel Computational Biology Seminar

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## Mechanics of lumina

Throughout the development of multicellular organisms, fluid-filled lumina enclosed by epithelial tissues form through an interplay of lumen pressure, cortical mechanics, and cellular adhesion of the cells surrounding the lumen. In this talk, I will give examples of this interplay:

First, I will show how active contractility and nonlinear emergent mechanics of the cell cortices appear at the scale of the lumen, in AFM indentation experiments, as new scaling exponents in the relation between indentation force and indentation depth.

Next, I will explore the consequences of the mechanical differences between apical, basal, and lateral cell sides that are inextricably linked with the establishment of apicobasal polarity and hence with lumen formation. Using an exactly solvable mean-field vertex model, I will show how the mechanics of all cell surfaces conspire to control lumen morphology and the instability of apical surfaces observed in MDCK cysts with tight junction perturbations.

Finally, I will turn to the mechanics of the small bicellular lumina that are nascent bile canaliculi in liver development.

Date: **Monday, 16 February 2026**

Time: **16:15 h – 17:15h**

Location: **Biozentrum, U1.191**

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