

Interdisciplinary Doctoral project

at the interface between engineering, biology, physics and informatics
at the [University Côte d'Azur](#)

Studying the mechanisms and mechanics driving epithelial tube formation

The formation of epithelial tubes is essential to build organs responsible to direct vital factors outside-in, inside-out or within a living animal (e.g., food and water in gut, air in lungs, saliva from salivary-tubes, blood in blood-vessels etc.). Therefore, tubing plays a critical role in multicellular life organized in stratified layers (i.e., where an inside and an outside is established). Understanding the mechanisms and mechanics responsible for tube formation is thus of great importance. Tube formation can result from tissue in-pocketing. The mechanisms responsible for in-pocketing are not well understood. To dissect and study this process, we use the sea urchin gastrula: a quite simple (i.e., powerful) model system ideal for *in vivo* mechanical studies. Our preliminary data highlight a possible combination of coordinated and radially planar cell polarized mechanisms that could be responsible for simultaneous uniaxial folding and extension of the vegetal plate. By implementing infra-red femtosecond ablation coupled to 4D multi-view light sheet microscopy, drug and RNAi perturbation, μ -aspiration and indentation to measure tissue mechanical properties, *in toto* 4D segmentation and mathematical modelling, this work will shine new light on the mechanisms and mechanics driving tissue in-pocketing for tube formation.

The project will be developed in the Rauzi lab that gathers people from different backgrounds (biology, informatics, physics, and engineering) to generate an interdisciplinary and synergistic group in an international environment.

We are seeking a motivated and talented candidate to develop this PhD project.

Send by the **12th of May 2021** a CV, a motivation letter, master scores/ranking and reference letters to matteo.rauzi@univ-cotedazur.fr

RAUZI LAB: <http://ibv.unice.fr/research-team/rauzi/>

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We are here!

