Morphogenesis

Results saved under:
{MainPath}/ExampleSimulations/Morphogenesis/
The script to visualize the saved data:
{MainPath}/ExampleSimulations/displaySave.sh — please modify executable path and select the morphogenesis option.
The video of simulation can be found under:
{MainPath}/ExampleSimulations/Morphogenesis/

As the animal embryo grows, the wing tissue starts from a flat tear drop shaped tissue, grows exponentially and forms three indentations from the top surface. These indentations later divide the tissue into the wing blade and "shoulder" and half the torso of the grown animal. My modelling proved this compartment marking emerges, emerges as a result of the correct combination between heterogeneities in the growth and physical properties of the tissue.

Tissue physical state:

The top surface has high stiffness due to dense polymer mesh on top: **actin rich layer** (actin is a cytoskeleton protein, forming this dense mesh at tissue surface).

The rest of the **cellular layer** is softer than the top surface. Both layers have a Poisson's ratio of 0.45.

The tissue is encapsulated in a very stiff **extracellular matrix layer**, this layer does not grow, but has remodeling with deformation (grows slowly in the direction that it is stretched).

The growth of the tissue is obtained from experimental measurements, binned into three time windows, mapped to a detailed spatial grid.