LadHyX Seminar – September 22, 10:45, – LadHyX Library

Alexander Chamolly,
LPENS / Institut Pasteur

Embrheology —
using fluid dynamics to understand the development of the quail[1]

Traditionally, biologists seek to understand development in terms of genes, proteins and biochemical processes. Recently however, an increasing amount of evidence points to mechanics as an equally important factor. In this talk I will present the Japanese quail, which can be modelled physically as a thin sheet of viscous fluid early in its development. A biological feedback mechanism in which actively generated stresses within the tissue regulate in response to tissue flows leads to a Turing-like patterning mechanism that predicts future embryonic territories and adjusts dynamically to mechanical perturbations. I will also talk about our recent efforts to quantitatively measure the rheological properties of this fragile system using a custom micromanipulator and mathematical mappings between viscoelastic and kinematically equivalent viscous flows.

[1] "caille" in French