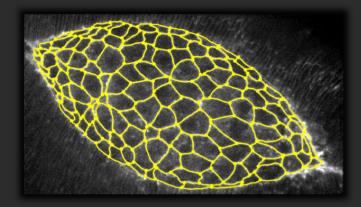# Data+ Fruit Fly Morphogenesis

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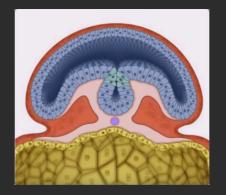
Overview

- This summer, our group studied how cells from embryos of the common fruit fly (*Drosophila melanogaster*) move and change in shape during development.

- Zou and Tomasi previously developed Cell-Sheet-Tracker (CST), an algorithm that uses a computer vision approach to mathematically model and track a dynamic network of epithelial cells using a deformable graph (see right).

- We present a graphical user interface, GraphGUI, that will enable rapid exchange of data with the CST and editing functionality to increase the accuracy of tracking.

Zou, R. S. & Tomasi, C. *IEEE Transactions on Medical Imaging* **35,** 1625–1635 (2016).

Importance

Investigating sheets of dynamic cells can offer insights into human developmental and regenerative processes such as:

- Neural tube closure [Spina bifida]
- Palatal fusion [Cleft palate]
- Wound healing

Questions to ask

How do the shapes and movements of mutant embryo cells quantitatively differ from those of wild type?

VS.

What is different about physical interactions between adjacent cells of mutant embryos?

(Brantley 2012)

GraphGUI: An Interactive Solution

- Segmentation for new sequence

- Rapid graph generation

- Loading preprocessed sequences

- Interactive graph editing

- Easy tracker initialization

- Display algorithm results in real-time

- Output biological parameters