

Abstract Submitted
for the SES06 Meeting of
The American Physical Society

Cellular Potts Models of Fruit Fly Embryogenesis JASON ROHNER, SHANE HUTSON, Vanderbilt University — Biologists have extensively studied embryonic development in the fruit fly (*Drosophila melanogaster*) as a model for morphogenesis. Our overall goal is to understand how the cellular rearrangements of morphogenesis are caused by the underlying forces between cells. To that end, we are developing means to replicate fruit fly embryogenesis (from cellular differentiation to dorsal closure) using cellular Potts models. Cells are described as collections of like “spins”; and spin-spin interaction energies are used to describe the forces along cell boundaries. Using a four state (spin-type) model (three tissue types and the surrounding media) we have reproduced cell sorting as well as engulfment of a surface grouping of tissue. Cell sorting can be accomplished using only the spin-spin interaction energies with the volume components being used only for cell size management. We are currently attempting to replicate the experimentally determined geometry and dynamics of dorsal closure. This modeling will take advantage of software tools developed at Notre Dame for looking at cellular Potts models and packaged as CompuCell3D.

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Date submitted: 21 Aug 2006

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