Growth and Symmetry: pattern formation on plants

Patrick Shipman
University of Maryland-College Park

Abstract: Tiling planforms dominated by diamonds (such as the diamond-shaped seeds on a sunflower head), hexagons, or ridges (such as those on saguaro cacti) are observed on many plants. We analyze PDE models for the formation of these patterns that incorporate the effects of growth and biophysical and biochemical mechanisms. The aim is to understand both the underlying symmetries and the information specific to the mechanisms. The patterns are compared to Voronoi tessellations, and we will start to draw a bigger picture of growth and symmetry in biological systems.