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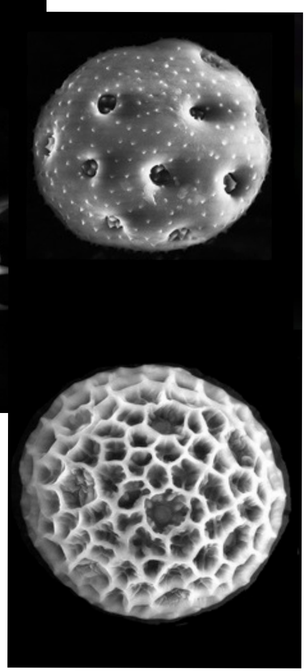
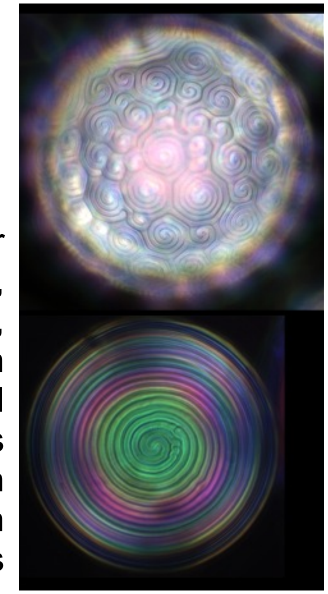
## "Putting Patterns on Spheres: Pollen Grains and Cholesteric Liquid Crystal Shells"





***Insect egg shells, mite carapaces, pollen grain surfaces***, and many other biological materials exhibit intricate surface patterns including stripes, spikes, pores, and ridges. Beautiful surface patterning occurs in cholesteric liquid crystals (CLCs), as well. I will discuss how to understand such surface patterning as a phase transition to a spatially modulated state on a sphere. On infinite, flat surfaces, the patterned states consist of uniform stripes or hexagons. On the sphere, however, the patterns are more varied because they must have topological defects, which may be accommodated in many ways. In these phase transition models, the patterns have a characteristic wavelength, which has important consequences for the thermal fluctuations in the system, including a fluctuation-driven qualitative change in the behavior near the phase transition. Focusing on spherical pollen grain development, I will describe what sets the characteristic wavelength, the influence of fluctuations, and how our simple model may be tested experimentally. CLCs also have an intrinsic, characteristic wavelength associated with the twist in the stacking of their constituent molecules. These compounds also exhibit phase transitions to spatially modulated states, over which we have good experimental control. I will discuss the behavior of spherical CLC shells and their surface patterns by drawing insights from experiments and simulations. We will end with a discussion of the nucleation and growth of such patterns.

## Friday, April 14, 2017 - 3:10 pm

**Franklin Miller, Jr. Lecture Hall**
**(Hayes Hall 109)**