**Pattern formation on pollen surface: The case of apertures.**

In an organism, deposition of extracellular materials next to a cell can protect the cell, change its growth and morphology, or help it to move and communicate with other cells. To be able to perform such important functions, extracellular materials must be deposited very precisely, but how cells achieve such precision is mostly unknown. A beautiful example of an extracellular structure with a very precise deposition is exine, the wall surrounding pollen grains. Pollen grains from different species often look remarkably different – in part, because wall materials are deposited at some places on pollen surface and absent from the others. The places where pollen wall is absent are called apertures, and these structures help pollen perform its reproductive function. Across species, pollen apertures often differ in shape, number, and positions, but within a species aperture patterns are usually the same. This suggests that, in a given species, developing pollen can consistently mark some of its surface regions as different from the rest of the surface, so that only certain areas will develop into apertures. In this talk, I will discuss what we currently know about the molecular mechanisms of aperture specification and formation based on the studies in the model organism *Arabidopsis thaliana*.