De-lamination and Pro-lamination of adhesive films on curved topographies BENNY DAVIDOVITCH, EVAN HOHLFELD, UMass Amherst — Attaching a solid film onto a sphere (or other curved shape) generates elastic stresses in the film. If the spherical substrate is totally rigid, the film will delaminate when its area exceeds a small fraction of the curved substrate. In contrast, if the substrate is very soft (such as a liquid drop), it will deform beneath the film, suppressing stresses and avoiding delamination of the film. Our theoretical analysis predicts that for very thin films, another scenario emerges - the film remains attached, developing tiny wrinkles that allow relaxation of stress without macro-scale deformation of the spherical shape of the substrate. Furthermore - as the film gets thinner, this predicted "pro-lamination" effect prevails parameter space, and should be observed for substrates with practically arbitrary stiffness.

Benny Davidovitch
UMass Amherst