Well-posedness for the Cahn-Hilliard equation on an evolving surface

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The classical Cahn-Hilliard equation is a fourth order, semilinear parabolic PDE which was first proposed in 1958 to describe phase separation in binary alloys, and it has since been applied to problems in other areas such as image processing, tumor growth models, among others. In this talk, we describe a functional framework suitable to the formulation of the constant mobility Cahn-Hilliard equation on an evolving surface and establish well-posedness for general regular potentials, the thermodynamically relevant logarithmic potential and a double obstacle potential. It turns out that, for the singular potentials, conditions on the initial data and the evolution of the surfaces are necessary for global-in-time existence of solutions, which arise from the fact that the integral of solutions are preserved over time. Time permitting, related models, examples and open questions will be discussed.