1112-82-589 **Julio C Armas-Perez**, **Jose A Martinez-Gonzalez**, **Xiao Li** and **Juan P Hernandez-Ortiz*** (jphernandezortiz@uchicago.edu), 5801 South Ellis Avenue, Jones 211, Institute for Molecular Engineering, University of Chicago, Chicago, IL 60637, and **Paul F Nealey** and **Juan J de Pablo**. *Avoiding local minima in chiral liquid crystals by a theoretically informed Monte Carlo: drops, complex geometries and interfaces.*

A theoretically informed coarse-grained Monte Carlo method is proposed to study confined liquid crystals. The free energy functional of the system is described in the framework of the Landau-de Gennes formalism. Two numerical approaches are used to integrate and approximate the alignment field and its gradients: finite differences and a finite element quadrature. The Monte Carlo approach presented is suitable to study situations where the free energy functional includes highly non-linear terms, like chirality and high-order deformation modes. While finite differences are restricted to relatively simple geometries, comprehensive schemes can be used to move solid inclusions within the domain. On the other hand, accurate geometrical descriptions are included in the finite element approach, thereby allowing the analysis of complex geometries. The methods are illustrated in the context of embedded nano-particles in liquid crystal droplets, confined blue phases and chemically induced bistable devices. In these situations, a delicate balance between elastic distortions and free energy penalizations at surfaces control the LC structure and the assembly of particles. In addition, curvature may produce topological frustration that results in free energy landscapes with many local minima. (Received August 11, 2015)