

## **A Structure-Preserving Parametric Finite Element Method of Anisotropic Geometric Flows**

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Designing a numerical scheme that can preserve the geometric structure for anisotropic geometric flows with an arbitrary anisotropic surface energy is a long-standing problem. In this talk, for anisotropic mean curvature flow and anisotropic surfacediffusion, we propose and analyse a structure-preserving parametric finite element methods (SP-PFEM) for the evolution of a closed curve in 2D, which preserve two geometric structures at the full-discretized level. The SP-PFEM innovates with a surface energymatrix and the Cahn-Hoffman  $\xi$ -vector, leading to a new geometric identity for dealing with the weighted mean curvature. This new geometric identity allows our SP-PFEM to be extended to other geometric flows with anisotropic effects. (Joint work with Prof. Weizhu Bao, National University of Singapore).