

Mathematical Challenges and Developments in the Nonlinear Bending Theory for Plates

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The nonlinear bending theory for plates describes the mechanics of a thin inextensible and incompressible film. It features a highly non-convex isometry constraint and a quadratic cost on second-order terms. This talk will be about modern developments in deriving an extension of the nonlinear bending theory for new materials, in a mathematically general and rigorous way using Gamma-convergence. I will begin by deriving a nonlinear bending theory for prestrained thin films, using convex-integration solutions to the Monge-Ampere equation. I will also discuss nonlinear bending theories for microheterogeneous thin plates and liquid crystal elastomer bilayers.