

# The Willmore flow in Riemannian spaces

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Abstract:

In this talk I will detail recent developments on the Willmore flow of surfaces in 3-manifolds with a prescribed Riemannian structure. If this structure is flat then local parabolic regularity for data in terms of the local  $L^2$ -norm of the second fundamental form is contained in Kuwert and Schätzle's previous work on the Willmore functional. If there is some ambient curvature then several problems arise: the evolution of key geometric quantities becomes more complex and tools such as the Sobolev inequality are either invalid or hold only in special circumstances. Using a new concentration of area method we are able to recover an analogue of Kuwert and Schätzle's local parabolic regularity theorem. We present one application yielding a global existence result in certain ambient spaces. This is joint work with Jan Metzger and Valentina-Mira Wheeler.