Abstract:
Varifolds, i.e. Radon measures on the Grassmannian bundle of unoriented d-planes of a Riemannian n-manifold, with d<n, generalize in a variational sense the concept of unoriented, d-dimensional submanifold.

By a suitable extension of classical variation operators, we introduce a notion of approximate second fundamental form that is well-defined for a generic varifold in the Euclidean n-space. Rectifiability, compactness, and convergence results are proved, showing in particular the consistency and stability of approximate curvatures with respect to 1-Wasserstein convergence. If restricted to the case of "discrete varifolds", this theory provides a new framework for extracting key features from discrete geometric data of general type. Some numerical tests on point clouds (evaluation of curvatures and geometric flows, also in presence of noise and singularities) will be shown. We shall also present some future perspectives and open problems.

This is a joint research with Blanche Buet and Simon Masnou.

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