Toric origami manifolds and asymptotical properties of planar graphs

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Toric origami manifold is a generalization of symplectic toric manifold: instead of a symplectic form we allow close 2-forms which may degenerate in a nice way. Symplectic toric manifolds are classified by Delzant polytopes: the images of their moment maps. Similarly, origami toric manifolds are classified by "origami templates" (collections of Delzant polytopes with some folding data).

Masuda and Park proved that every 4-dimensional quasitoric manifold admits toric origami structure. The same question about higher dimensions arises. Using metric and coloring properties of planar graphs we proved the following fact: almost every simple 3-polytope supports a quasitoric manifold which is not toric origami.