

The toric geometry of triangulated polygons in Euclidean space.

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This talk will be based on two papers. The first paper is joint with Misha Kapovich, It is "The symplectic geometry of polygons in Euclidean space". It appeared in the Journal of Diff Geom., vol. 44 (1996). The second is joint with Ben Howard and Chris Manon. It is "The toric geometry of triangulated polygons in Euclidean space". It appeared in the Canadian J. of Math, vol. 63 (2011). I will explain why the moduli space M_r of n -gons with fixed side-lengths $r=(r_1, \dots, r_n)$ in Euclidean three space has a Kahler, hence symplectic structure. I will then explain why a triangulation of a reference convex n -gon leads to a not everywhere defined completely integrable system on M_r so M_r is almost a toric variety. I will then explain how to "degenerate" M_r to get a toric variety $(M_r)_0$ (so the flows become everywhere defined on $(M_r)_0$). I will try to make sure that everyone in the audience knows what a toric variety is by the time she/he leaves the lecture. It is remarkable that the moduli space M_r is related to so many other fields of mathematics.