# An application of curvature flows to convex geometry

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(Tea 3:30 pm Math Lounge)

**Abstract**

Curvature flows are characterized by the deformation of geometric objects such as metrics, mappings, or submanifolds by geometric quantities depending on curvature. They can be used to understand some canonical or optimal states which are the states preferred by the evolving geometric object. For example, closed convex hypersurfaces in $\mathbb{R}^{n+1}$ evolving under the affine curvature flow *tend* to become ellipsoids. We will use this flow to answer, under some assumptions, a seemingly unrelated question known as the floating body problem.

Let $K \subset \mathbb{R}^{n+1}$ be a convex body and let $\delta > 0$ a sufficiently small real number. We call the floating body associated to $K$, denoted $K_\delta$, the intersection of all half-spaces in $\mathbb{R}^{n+1}$ whose complements cut from $K$ a cap of volume $\delta$. Conjectured in the $90$'s, the floating body problem states that $K$ is homothetic to $K_\delta$ if and only if $K$ is an ellipsoid.

This talk should be accessible to undergraduates.