Dividing a set in half

Monday, July 4, 2022 11:30 AM (1 hour)

In this talk I will consider the following problem of isoperimetric type:

Given a set E in $\mathbb{R}^d$ with finite volume, is it possible to find an hyperplane P that splits E in two parts with equal volume, and such that the area of the cut (that is, the intersection of P and E) is of the expected order, namely $(vol(E))^{1-1/d}$?

We can show that the answer is positive if the dimension d is 3 or higher, but, somewhat surprisingly, our proof breaks down completely in dimension $d = 2$, and we do not know what happens in this case.
(However we know that the answer is positive even for $d = 2$ if we allow cuts that are not exactly planar, but close to planar.)

This is a work in progress with Alan Chang (Princeton University).

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