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**Alex Kunin**, abk170@psu.edu, **Caitlin Lienkaemper\***, clienkaemper@psu.edu, and **Zvi Rosen**, rosenz@fau.edu. *Convex Neural Codes and Oriented Matroids*.

A combinatorial neural code is a subset of the power set  $2^{[n]}$ . A neural code is convex if it arises as the intersection pattern of convex open sets in  $\mathbb{R}^d$ . In the past few years, there has been considerable progress on characterizing which neural codes are convex, but the problem remains wide open. Here, we show that a code has a realization with convex polytopes if and only if it is the image of a representable oriented matroid under a neural code morphism. We show that all known examples of non-convex codes are non-convex because they are not the image of any oriented matroid under a code morphism. (Received August 19, 2019)