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*Group actions on homology 3-spheres*

I will discuss finite group actions on integral or rational homology 3-spheres. The main examples for this talk are the Brieskorn integral homology 3-spheres  $M(p, q, r)$  arising from isolated singularities, which bound smooth 4-manifolds with definite intersection forms. In addition, there are special infinite families of Brieskorn homology 3-spheres which can be realized as boundaries of smooth contractible 4-manifolds. We ask whether the free periodic actions on Brieskorn spheres extend to smooth actions with isolated fixed points on one of these associated 4-manifolds.