1116-42-2108 **Marc Carnovale***, 231 West 18th Ave, Columbus, OH 43210. *Arithmetic progressions in sparse pseudorandom subsets of the real numbers.*

What does the arithmetic combinatorics of $\mathbb{R}$ look like? At least since Erdos and Volkmann posed the Erdos Ring Conjecture in 1966, we have known that the language for such questions is that of geometric measure theory. In this talk, we will be concerned with the simplest such arithmetic questions one may ask: How large must a subset of $[0, 1]$ be in order to contain k-term arithmetic progressions? As in the discrete world, a result of Keleti shows that once the set is sparse enough, it is necessary to make pseudorandomness assumptions. Using Roth-like arguments, in 2009 Laba and Pramanik showed that sets with sufficiently large "Fourier dimension" contain 3APs. We use Gowers uniformity norms to introduce a higher-order analog of the geometric-measure theory notion of Fourier dimension, and use this together with some Littlewood-Paley type arguments to demonstrate that sparse pseudorandom subsets of the real line contain k-term arithmetic progressions. (Received September 21, 2015)