TEXAS ★ STATE

UNIVERSITY ®

The rising STAR of Texas

Discrete Mathematics Seminar

Time: Friday, September 14, 2018, 2:15 - 3:15 PM
Location: 330 Derrick Hall
Title: Subspaces in difference sets in vector spaces
Speaker: Dr. Hoang Le, Department of Mathematics, University of Mississippi

Abstract:

A common theme in additive combinatorics states that if A is a subset of positive density of a vector space $\mathbf{F}_p^n$, then the difference set $A - A$ must contain a large subspace. Furthermore, the more sums or differences we take (e.g. $A + A - A - A$), the larger subspaces we are guaranteed to find. I will talk about two results in this theme. In joint work with Zhenchao Ge, we generalize and simplify the proof of a result of Sanders, which says that if $A \subset \mathbf{F}_p^n$ has density $1/2 - c(p)/\sqrt{n}$, then $A - A$ contains a subspace of codimension 1. In joint work with Pierre-Yves Bienvenu, we show that if A is a subset of positive density of $\mathbf{F}_p^n \times \mathbf{F}_p^n$, then by doing more restrictive operations on the coordinates of A, the resulting set also contains nice structures. The same result was obtained independently by Gowers and Milicevic. Time permitting, we will sketch an elementary proof of our first result.