

# Student Research Talks (StReeTs)

Mason Experimental Geometry Lab (MEGL)

## An Enumeration Problem Arising from Van der Waerden Hypergraphs

**Julian Benali**

Department of Mathematics Sciences  
George Mason University



### Abstract

For  $3 \leq k \leq N$ , we define the Van der Waerden hypergraph,  $W(k, N)$ , to be the hypergraph whose vertex set is  $\{0, 1, \dots, N - 1\}$  and whose hyperedges are the  $k$ -term arithmetic progressions contained in  $\{0, 1, \dots, N - 1\}$ . The Van der Waerden Hypergraph has been of great interest since B. L. Van der Waerden proved in 1927 that its chromatic number tends toward infinity as  $N \rightarrow \infty$  for any fixed  $k$ .

In this talk, we are interested in the independence number of  $W(k, N)$ . During their research on the independence number of  $W(k, N)$ , Johnson and Yang (2018) discovered a maximal independent vertex set in the case that  $k$  and  $N$  are powers of a prime. We establish bounds for the size of this maximal independent set as well as a linear recurrence relation.

Date: Friday, Feb 1, 2019

Time: 2:30pm–3:20pm

Place: Exploratory Hall 4106

**Pizza and soda will be served at the presentation.**

For further information or for special accommodations, please contact Sean Lawton via email at [slawton3@gmu.edu](mailto:slawton3@gmu.edu) or drop by the MEGL.