

# Discrete Mathematics Seminar

Illinois State University

2:00–2:50 pm, April 15

Speaker: Michael Santana, Grand Valley State University

## Cycles in graph with bounded independence number

In 1963, K. Corrádi and A. Hajnal verified a conjecture of Erdős by showing that every  $n$ -vertex graph where  $n \geq 3k$  and  $\delta(G) \geq 2k$  contains  $k$  vertex-disjoint cycles. The conditions in this statement are known to be best possible, and in 2017, Kierstead, Kostochka, and Yeager provided a complete characterization of all the sharpness examples. In particular when  $k > 2$  and  $n > 3k$ , every sharpness example contains an independent set of size  $n - 2k + 1$ . This hints that one can attempt to generalize the theorem of Corrádi and Hajnal by weakening the minimum degree condition, provided that the independence number is not too big. This indeed is the case, and in this talk we will discuss how there exists constant  $t_0$  and  $\beta$  such that for all  $t \geq t_0$ ,  $k \geq 25t$  and  $n \geq 4k + t$ , if  $G$  is an  $n$ -vertex graph with  $\delta(G) \geq 2k - t$  and  $\alpha(G) \leq n - 2k - t + \beta\sqrt{t \log t}$ , then  $G$  contains  $k$  vertex-disjoint cycles, and furthermore, this is sharp up to the constant  $\beta$ .

This is joint work with Theodore Molla.

