

# Discrete Mathematics Seminar

Illinois State University

2:00–2:50 pm, September 5@ STV 121

Speaker: Xujun Liu, University of Illinois at Urbana-Champaign

## Monochromatic connected matchings, paths and cycles in 2-edge-colored multipartite graphs

We solve four similar problems: For every fixed  $s$  and large  $n$ , we describe all values of  $n_1, \dots, n_s$  such that for every 2-edge-coloring of the complete  $s$ -partite graph  $K_{n_1, \dots, n_s}$  there exists a monochromatic (i) cycle  $C_{2n}$  with  $2n$  vertices, (ii) cycle  $C_{\geq 2n}$  with at least  $2n$  vertices, (iii) path  $P_{2n}$  with  $2n$  vertices, and (iv) path  $P_{2n+1}$  with  $2n + 1$  vertices.

This implies a generalization of the conjecture by Gyárfás, Ruszinkó, Sárközy and Szemerédi that for every 2-edge-coloring of the complete 3-partite graph  $K_{n,n,n}$  there is a monochromatic path  $P_{2n+1}$ . An important tool is our recent stability theorem on monochromatic connected matchings (A matching  $M$  in  $G$  is connected if all the edges of  $M$  are in the same component of  $G$ ). Joint work with József Balogh, Alexandr Kostochka and Mikhail Lavrov.

