

# VCU Discrete Mathematics Seminar

*On a Conjecture of Nagy  
on Extremal Densities*

**Prof Amites Sarkar**  
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Wednesday, Feb. 17

1:00-1:50

Zoom! @ <https://vcu.zoom.us/j/92975799914>  
password=graphs2357



Given two graphs  $G$  and  $H$ , let  $N(G, H)$  be the number of copies of  $G$  in  $H$ . Fix a graph  $G$  and some  $b \in (0, 1)$ . Among all graphs  $H$  on  $n$  vertices, with edge density at most  $b$ , how large can  $N(G, H)$  be? Nagy conjectured that, as  $n$  grows,  $N(G, H)$  is always asymptotically maximized by either a quasi-clique or a quasi-star.

Results by a large number of authors, including Ahlswede and Katona, and Alon, seemed to support this conjecture, and it was known to be true in a large number of cases. In this talk, we show that the conjecture is in fact false for infinitely many graphs  $G$ . We also present a new conjecture, and discuss the evidence supporting it.

This talk is based on joint work with Nick Day.

For the DM seminar schedule, see:

<https://www.people.vcu.edu/~nobushaw/dms.html>