# Department of Mathematics and Computer Science

**Friday, March 22, 2019, 4:10 pm**

**COLLOQUIUM TALK**

**Speaker: Andrew Parrish (EIU)**

**Old Main 2210**

# From Khinchine's Conjecture to Erdös' Similarity Conjecture


## Abstract:

The first of Littlewood's Three Principles is that

> "Every (measurable) set is nearly a finite sum of intervals."

It is perhaps not surprising, then, that we find profound parallels between topological and measure-theoretic dynamics. However, sometimes, "nearly" is not enough. In 1923, Khinchine conjectured that for any Lebesgue measureable $E \subseteq (0,1)$, we have that

$$\frac{1}{N}\sum_{k=1}^{N} \mathbf{1}_E(kx) = mE,$$

where multiplication was considered modulo 1, for a.e. $x \in (0,1)$. This conjecture was shown to be false by J.M. Marstrand in 1970. We will discuss a related conjecture due to Alexandra Bellow, its resolution by Jean Bourgain, and a new approach that resolves precisely for which sets Bellows' conjecture holds. We will then discuss a related perspective on Erdös' Similarity Conjecture.

*This is joint work with Joseph Rosenblatt.*


SNACKS IN FACULTY LOUNGE AT 3:30 PM.
EVERYONE WELCOME (EVEN IF YOU ARE UNABLE TO ATTEND THE TALK)