

# MATHEMATICS & COMPUTER SCIENCE COLLOQUIUM

**PETER PIVOVAROV**  
**University of Missouri**



**Friday – April 01, 2016**  
**12:00 to 12:50 pm**  
**UHall D634**

## **RANDOMIZATION OF ISOPERIMETRIC INEQUALITIES IN CONVEX GEOMETRY**

PETER PIVOVAROV (UNIVERSITY OF MISSOURI)

ABSTRACT. In convex geometry there is a wealth of extremal inequalities relating fundamental metric quantities such as volume, surface area and mean width. These often arise by maximizing or minimizing a functional  $\phi$  over all convex bodies of a given volume; for example, if  $\phi(K)$  is the surface area of a convex body  $K$ , then minimization leads to the classical isoperimetric inequality with the Euclidean ball as the extremal case.

I will start by reviewing several such inequalities including the isoperimetric inequality and the closely related Brunn-Minkowski inequality on the Minkowski (vector) sum of convex sets and their volume. I will then discuss how these can be thought of as “global” inequalities that arise through a “local” random approximation procedure. This leads to randomized versions for which a stronger stochastic dominance holds. Moreover, they recover the original inequalities via laws of large numbers. The approach involves a merger of techniques from stochastic geometry and analysis. I will explain how stochastic dominance arises and its usefulness. The talk will be expository, with no special background assumed.

**EVERYONE IS WELCOME!**

**Light refreshments.**