

Geometry, Groups and Dynamics/GEAR Seminar  
(held at the Illinois hub of GEAR )

Tuesday, April 28, 2015, 1:00 pm in 243 Altgeld Hall

**Byron Heersink (Illinois)**

**An effective asymptotic result for the Lebesgue measure of the sum-level sets for continued fractions**

Abstract: For every positive integer  $n$ , let  $C_n$  be the set of real numbers in  $[0,1]$  whose continued fraction expansion  $[a_1, a_2, \dots]$  satisfies  $a_1 + \dots + a_k = n$  for some  $k$ . Using results from infinite ergodic theory, Kessebohmer and Stratmann proved that the Lebesgue measure of  $C_n$  is asymptotically equivalent to  $1/\sqrt{\log_2 n}$  as  $n$  approaches  $\infty$ . In this talk, we provide a simplified proof of this result, mostly using basic properties of the transfer operator of the Farey map and Karamata's Tauberian theorem, while avoiding most of the ergodic results in the proof of Kessebohmer and Stratmann. Additionally, we obtain an error term by adapting Freud's effective version of Karamata's theorem to this situation.

[Video](#)