

# Undergraduate Mathematics Seminar

Department of Mathematics, Fall 2020



## Coarea Inequality

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**Date:** Tuesday, October 6

**Time:** 12:00 - 12:50 pm, EDT

**Location:** Zoom, ID: 935 1032 7072

Behnam started his PhD at Pitt in August 2015. He hopes to defend his thesis in Summer 2021 and plans to continue with a post-doc in his field. Behnam's primary research is in geometric measure theory – where analysis and geometry meet. He loves the teaching aspect of his job as much as math itself!



If  $n < m$  and  $f : \mathbb{R}^n \rightarrow \mathbb{R}^m$  is an injective (and reasonably nice) function then image of  $f$  is an  $n$ -dimensional object sitting inside the larger  $\mathbb{R}^m$ . Examples: a curve or surface in  $\mathbb{R}^3$ . But what if we turn the tables and consider functions  $f : \mathbb{R}^m \rightarrow \mathbb{R}^n$  where  $m > n$ ? There is just not enough room and many points must map to a common target point. In this talk I will explain the precise mathematical meaning of the following and end with the Coarea Inequality:

*If  $m > n$ , and  $f : \mathbb{R}^m \rightarrow \mathbb{R}^n$  is Lipschitz, then for almost every  $y \in \mathbb{R}^n$ , the set of points that map to  $\{y\}$  is  $(m - n)$ -dimensional.*

### SPEAKER(S) FOR NEXT WEEK:

Dr. Cezar Lupu

