

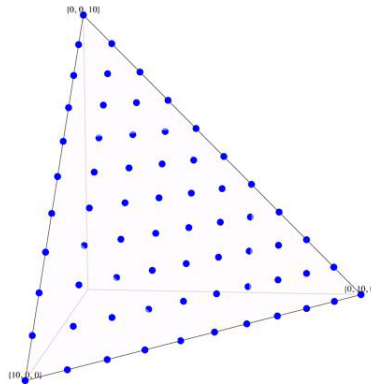
# STudent REsearch TalkS (StReTs)

Mason Experimental Geometry Lab (MEGL)

## Lattice Point Enumeration

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### Abstract

Consider the following set of inequalities where  $n$  is a positive integer:

$$x + y \leq n, \quad x \geq 0, \quad y \geq 0.$$

In the  $xy$ -plane the solution of this system is the region bounded by the triangle with vertices  $(0,0)$ ,  $(n,0)$ ,  $(0,n)$ . Assume we are looking for the number of integer solutions to the above system. A simple formula shows this number is  $\frac{n^2}{2} + \frac{3n}{2} + 1$ , which happens to be a degree 2 polynomial in  $n$ . This is not a coincidence! It is an example of how to count lattice points inside dilations of polytopes with integer vertices. In this talk we give a brief introduction to the theory of lattice point enumeration, also known as “Ehrhart Theory”. We present some elementary formulas that work in dimension 2 and then we proceed to higher dimensions. We give instances of how this theory appears in several areas of mathematics.

Date: Friday, March 20, 2015

Time: 2:30pm–3:30pm

Place: Exploratory Hall 4106

**Pizza and soda will be served at the presentation.**

For further information or for special accommodations, please contact Sean Lawton via email at [seanlawton@gmail.com](mailto:seanlawton@gmail.com) or drop by the MEGL.