

# MATH RESEARCH WEEKEND

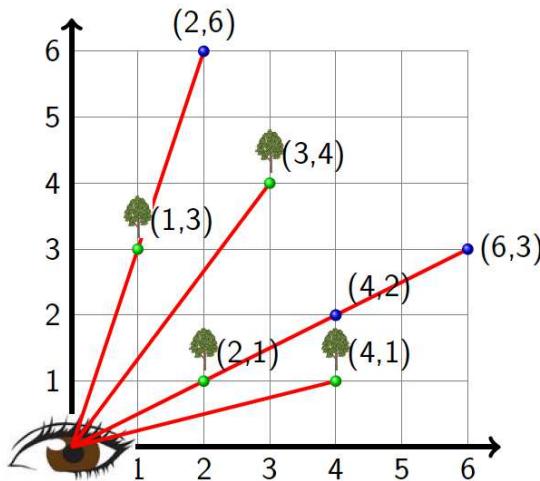
January 26-27, 2018

Department of Mathematics, SUNY Geneseo

Dr. Pamela E. Harris, Williams College

**Title:** Invisible Lattice Points

**Description:** A point  $(x, y) \in \mathbb{N}^2 = \mathbb{N} \times \mathbb{N}$  is said to be **invisible from the origin** if there exists an integer  $c \geq 2$  that divides both  $x$  and  $y$ , that is,  $\gcd(x, y) > 1$ . If  $(x, y)$  is invisible from the origin and  $c$  is the largest integer dividing both  $x$  and  $y$  then the point  $(x, y)$  is blocked by the point  $(\frac{x}{c}, \frac{y}{c})$  when viewed from the origin along the line-of-sight from  $(0, 0)$  through  $(x, y)$ . For example, the point  $(6, 3)$  is invisible from the origin since it is blocked by  $(\frac{6}{3}, \frac{3}{3}) = (2, 1)$ , see figure below.



Natural questions that arise are the following:

- (i) What is the proportion of points in  $\mathbb{N}^2$  that are invisible from the origin?
- (ii) Within the points that are invisible from the origin, are there arbitrarily large patches of hidden points? And how can we find them?
- (iii) How do the answers to these questions change when we consider more general *curves-of-sight*?
- (iv) How about considering points in  $\mathbb{N}^d$  for  $d \geq 3$ ?

Come and join Dr. Pamela Harris in this year's MATH RESEARCH WEEKEND (MRW) to learn about invisible lattice points and get some experience with what mathematical research is all about.

**Pre-Requisites:** Students should have completed MATH 239 (Intro to Proof) with a C- or better.

To apply go to [www.geneseo.edu/math](http://www.geneseo.edu/math) and look for the link to the online application (Deadline is Jan 24)

**Program Schedule:**

Friday, January 26

- (i) 2:30-3:30 pm: Colloquium Talk in Newton 214, Title: *Invisible Lattice Points*
- (ii) 4:00-4:30 pm: Pizza dinner (South 336)
- (iii) 4:30-7:00 pm: First session (South 336)

Saturday, January 27 in South 336

- (i) 9:00-11:59 am: Second session
- (ii) 12:00-1:00 pm: Lunch
- (iii) 1:00-4:00 pm: Third session