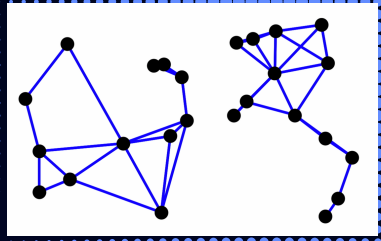# DEPARTMENT OF MATHEMATICS

H.

FALL 2023

80TH KIEVAL LECTURE

FRIDAY, OCTOBER 27
7-8 PM IN SCI B 135

Distance Makes the Math Grow Deeper:
Rational Distance Sets, Nate Dean, and Me
Dr. Edray Goins
Professor of Mathematics, Pomona College

The points: (0,0), (3,0) and (3,4) form a 3-4-5 triangle. In particular, the distance between each pair of points is an integer. In 1945, Paul Erdős and Norman Anning showed that for any integer n $\geq$ 3, there is a collection of n points in the plane, not all on a line, such that the pairwise distances are integers. In 2000, Nate Dean asked: "Are there four points on a parabola such that each pairwise distance is a rational number?" Garikai Campbell answered this question in 2003 using elliptic curves. But what about shapes other than lines or parabolas? Richard Guy, in his book *Unsolved Problems in Number Theory*, asked:

"What is the largest number of points in the plane such that:
    (1) all pairwise distances are rational numbers,
    (2) no three of the points are on a line,
    (3) no four of the points are on a circle?"

In this talk, we will discuss the beautiful results discovered by the speaker's REU students, who worked on this question during MSRI's Undergraduate Program in 2010. The talk will also feature the personal relationships the speaker gained working with various African American mathematicians to find points on conic sections at rational distances.

The presentation is dedicated to the life, works, and friendship of the late African American mathematician Nate Dean (January 9, 1956 - February 18, 2021).

FOR MORE INFO GO TO
HTTPS://MATH.HUMBOLDT.EDU/GET-INVOLVED/KIEVAL-LECTURE

SCAN ME