

DEPARTMENT OF MATHEMATICS AND STATISTICS  
MISSISSIPPI STATE UNIVERSITY

# COLLOQUIUM

## Dynamical Geometry: From Order to Chaos and Sierpiński Pedal Triangles

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Allen 14

**Abstract.** We give an introduction to *discrete dynamical geometry*, an iterated dynamical system of geometric figures. A regular behavior is observed for some kinds of iterated triangles and cyclic polygons, and it can be provided via the Perron-Frobenius theory of nonnegative matrices. But an irregular or chaotic behavior appears when a sequence of *pedal triangles* of a given triangle are generated. Using pedal triangles, we construct new fractals called *Sierpiński pedal triangles* since they reduce to the famous Sierpiński triangle when the initial triangle is equilateral. The fractal dimension of Sierpiński pedal triangles is also calculated, and it is shown that the well known dimension  $\ln 3 / \ln 2$  of the Sierpiński triangle is a local minimum of those of Sierpiński pedal triangles. It is conjectured that this local minimum is also a global minimum.

This talk serves as a sightseeing tour on the way from order to chaos in the garden of dynamical geometry.

There will be refreshments in Allen 467 at 3:30 pm.

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