

# Instrumentation and Laboratory Improvement Grant at Gustavus Adolphus College

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Through the Instrumentation and Laboratory Improvement grant from the National Science Foundation, which provided matching funds for the purchase of eight Silicon Graphics workstations, Mathematics Education majors at Gustavus Adolphus College are integrating computer visualizations of geometric ideas into the college geometry course. This poster illustrates some of the geometric visualizations rendered by Mathematica, Geometer's Sketchpad, and Non-Euclid 4.0, a program from Rice University.

On the center panel are the five Platonic solids rendered in color by Mathematica. Information on how Mathematica function "Live" makes it possible to examine three dimensional objects by rotating them in space and zooming in for detail is also provided on this panel. Under the heading "Projective Geometry", the software package *Geometer's Sketchpad* is used to illustrate a harmonic range and projectivities between pencils of the Projective Plane. Additionally, one and two point perspective renditions of a box are shown on the center panel.

On the left panel, under the heading "Euclidean Geometry", a Desargues Configuration and the intriguing "nine point circle" are presented. The Desargues Configuration illustrates the fact that two triangles which are perspective from a point are also perspective from a line and conversely. The nine point circle contains the midpoints of the sides of the associated triangle, the feet of the altitudes and the midpoints of the segments joining the vertices of the triangle with its orthocenter. Under the heading "Constructions", the left panel also illustrates several classic relationships between circles and triangles.

On the right panel a program from Rice University, called Non-Euclid 4.0 is used to provide examples of angles of parallelism and also Sacceri quadrilaterals from the Poincare model under the heading "Non-Euclidean Geometry". Above this on the right panel, Mathematica is used to provide illustrations of various transformations of the Euclidean plane. Examples of translations, reflections, rotations and circle inversions are placed under the heading "Transformations", along with an explanation of how to produce animated transformations.

In summary, each of the three panels of the poster is divided into distinct aspects of computer visualizations along with minimal text explanations.