Introduction to Algebraic Geometry and Applications

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Algebraic geometry is the study of geometric objects defined by polynomial equations. For example, the locus of points in the plane satisfying the equation

$$x^2 + y^2 = 1$$

is the circle of radius one centered at the origin.

Many geometry problems become beautifully transparent when expressed in algebraic language. One elegant classical example will be sketched in Dr. Jones' talk. At the same time, when computers are used to manipuate images, the first step is to translate the graphical objects into algebraic form, as Dr. Goldman will demonstrate. Indeed, computational examples are one of the best introductions to the field.

There are numerous connections between algebraic geometry and other fields of pure mathematics, e.g., knot theory and algebraic topology, number theory, and complex analysis. Some of these will be sketched in the lectures by Drs. Cochran, Rasmussen, and Wolf. In each case, algebraic techniques for evaluating key basic invariants are of fundamental importance.