1067-A0-41   **Melanie Matchett Wood***, American Institute of Mathematics; and Stanford University, Dept. of Math, Sloan Hall, Stanford, CA 94305. *Binary quadratic forms: From Gauss to algebraic geometry.*

Gauss's composition law on binary quadratic forms with integral coefficients is one of the gems of number theory that has been leading to new mathematics for over 200 years. We will see how these simple quadratic polynomials of two variables can be themselves multiplied via a group law discovered by Lagrange, Legendre, and Gauss before there was a concept of an abstract group. These quadratic forms are linked to unique factorization and its failure in most rings of numbers larger than the integers. We will further explore what happens when the coefficients of the polynomials are allowed to be from rings larger than the integers and how we are led to new kinds of binary quadratic forms, eventually taking their coefficients in rings of functions on geometric spaces and telling us about the geometry of those spaces. (Received June 10, 2010)